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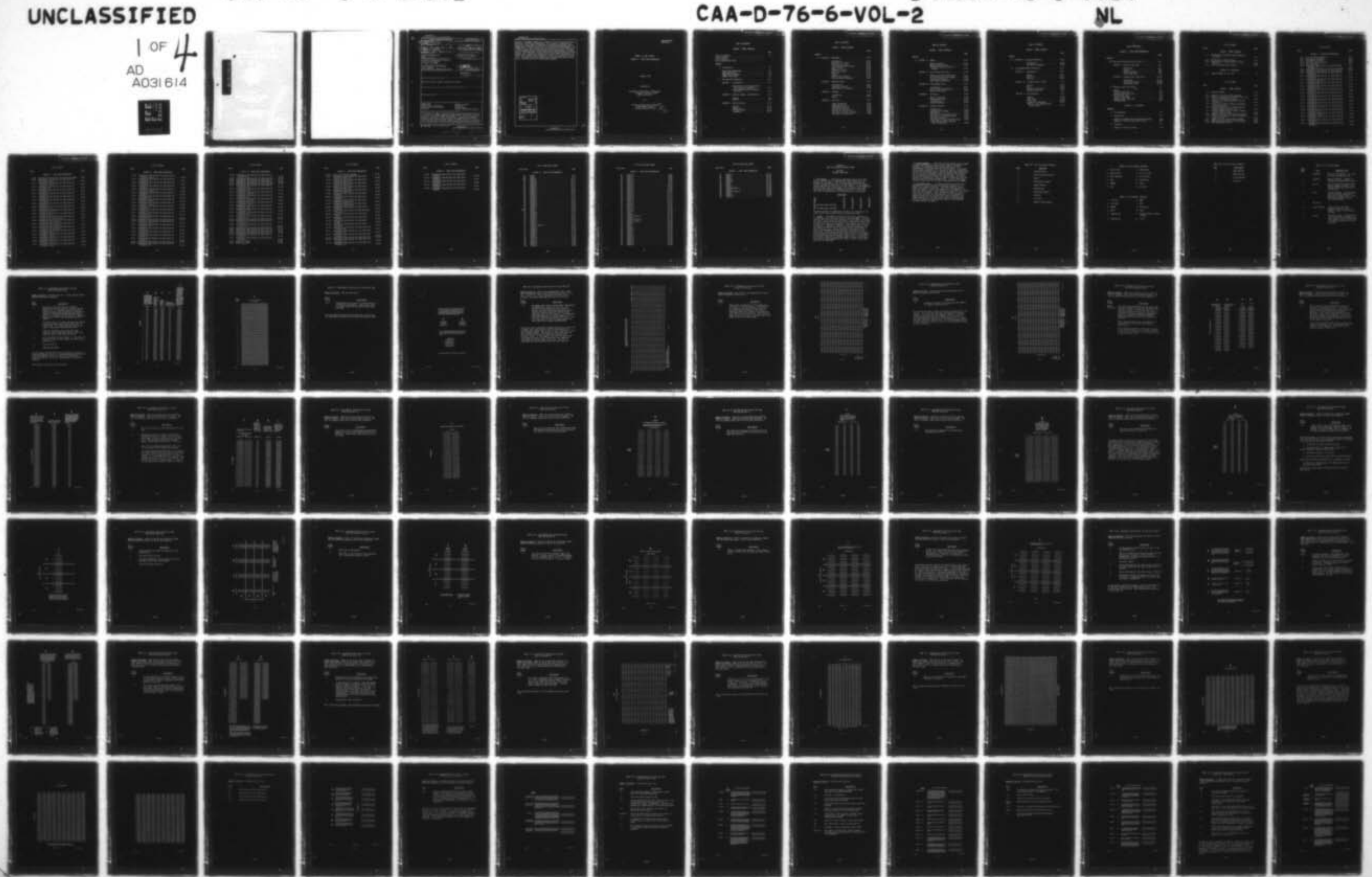

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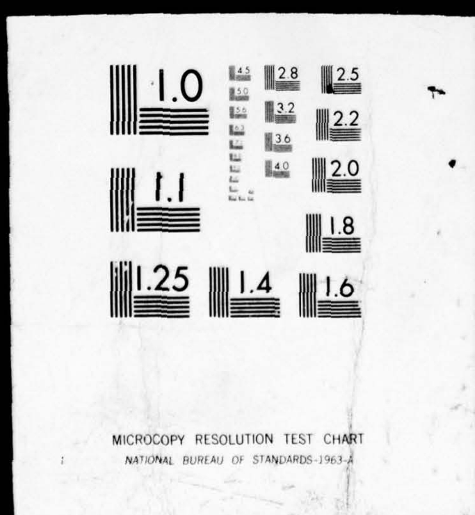

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This document is a manual to assist military and operations research analysts in the use of the COMMEL (communications-electronics) II Model and in the preparation of the input data base for the model. This manual was prepared by Evaluation Technologies, Incorporated (ETI) under contract to the US Army Concepts Analysis Agency (CAA) to document the COMMEL II Model, as improved by ETI; a CAA updating of the manual, where required, based on experience gained while using the model in early 1976 has been included in this edition of the

409903

document. The COMMEL II Model was an element of the CAA study "Communications Operational Effectiveness Methodology." This study was an element of the Operational Effectiveness of Communications methodology development program sponsored by the Deputy Chief of Staff for Operations and Plans (DCSOPS). The COMMEL Model is a fully computerized combat simulation which includes dynamic interface between tactical operations and communications systems. The model output provides statistics on both communications system performance and combat outcome. The COMMEL Model simulates division-level combat with resolution to company level. Tactical and communications activities are represented by four interrelated submodels which periodically transmit event statistics to output files. The model is basically deterministic although message routing factors may be varied through use of a random number generator.

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COMMEL II USER'S MANUAL

VOLUME II - INPUT DATA PREPARATION

October 1976

Prepared by

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Arlington, Virginia 22209
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for

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8120 Woodmont Avenue
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CHAPTER IV
INPUT DATA BLOCKS AND ENTRY FORMS

SECTION 1
TACTICAL INPUT DATA

1. Data Blocks. - The tactical data base consists of 37 data blocks. Two of these are combined with other data blocks for purposes of discussion. Also, one data block which describes tactical message characteristics is described only in the communications data portion (section 2) of this chapter. Of the remaining 34 data blocks, each is described on up to 10 data entry forms. Each entry form describes a different portion of a data block. The order of presentation of the 34 data blocks is as follows:

Block Name

AA	CA	EE	JA	PC
AAA	CC	EG	KA	PD
AB	DA	EM	LA	QA
AT	EA	FA	LB	RA
BA (includes data block BE)	EB	FB	OA	RB
BB	EC	FC	PA	WE
BC (includes data block BD)	ED	HA	PB	

The above ordering is alphabetical and does not correspond to the order in which the computer reads the input data blocks.

2. Format. - Following this page will be found a complete set of input data entry forms for tactical inputs to COMMEL. Each form consists of a part of a data block which is subdivided into columns (or lines) each of which can contain data values for a single input variable or a single input array (e.g., the 'weapon type' input is an array of 12 subtypes of weapons). Each entry column (or line) is headed by a description of the input variable represented by that column (or line). Since such annotations must be brief, a table of supplementary data descriptions is provided for each entry form. In addition to giving further detail on each input, the supplementary description tables give the limits on the number of data values that can be entered in each column. In addition, these tables indicate entry columns common to several data blocks by explicitly cross-referencing the blocks in which a given data entry must be referenced.

3. Example Comments. - Each data form has sample values already entered. The specific numeric entries shown are frequently explained in a commentary which usually follows the last supplementary description table for the data block. The purpose of the example commentary is to succinctly describe a hypothetical application of the data block. Whereas the data descriptions are often in abstract and general terms, the example and commentary can describe their significance in concrete terms. The sample entries are reasonable in terms of range of acceptable values but should be used for example purposes only. As such, they do not represent actual data for or from a study application of COMMEL.

4. Use of Data Forms. - The forms containing the data blocks described can not be employed for entering a complete set of COMMEL data created by the user. The forms shown are neither blank nor complete. Should the reader desire a complete set of blank data forms, copies can be obtained by contacting the issuing office of this document. After entering the data on a set of blank forms, the user can apply Chapter V of this document to translate these entries into ADP card formats readable by the COMMEL preprocessor. The lower left corner of each data form contains an Input Form identification used to cross-reference with descriptions in Chapter V.

TABLE IV-1, Unit Type Codes (Example)

Code	Type Unit
1	Towed Artillery
2	Self Propelled Artillery
3	Mortar
4	Recon/Scout Platoons
5	Signal Centers
6	Command Posts
7	Mechanized Infantry
8	Infantry
9	Tank Units
10	Support, Miscellaneous

TABLE IV-2, Blue Weapons (Example)

1.	M-60 A1 Tank	7.	81mm Mortar
2.	M-60 A3 Tank	8.	4.2 in. Mortar
3.	M-551 Sheridon	9.	M-113 A1 APC
4.	TOW	10.	Machine Gun
5.	DRAGON	11.	Rifle
6.	LAW	12.	Not Used

TABLE II-3, Red Weapons (Example)

1.	T-62 Tank	7.	BRDM
2.	T-72 Tank	8.	BMP
3.	SAGGER	9.	Machine Gun
4.	RPG-7	10.	SPG-7
5.	100mm AT Gun	11.	Multiple Rocket Launcher (122mm)
6.	120mm Mortar	12.	Rifle

TABLE IV-4, Artillery Types (Example)

Type	Description
1	105mm Howitzer
2	155mm Howitzer
3	8 inch Howitzer
4	175mm Gun

TABLE IV-5, Group Move Modes

Group Mode	Type	Characteristics
1	Withdrawal	Used only for defender. All units will have maximum move rate.
2	Leapfrog	Used for defender. Movement is through bounds separated by pauses.
3	Reserve	Units in reserve are moved by the pattern movement routines. Some attacker groups are initially set to this mode.
4	Yield	Used for defender. An unfavorable (low) force ratio determines a high move (fallback) rate. As the force ratio becomes favorable, this rate decreases.
5	Not Used	
6	Static Defense	Groups reaching the final objectives are set to static defense. Groups in this mode do not move.
7	Attack	Used for attacker. An unfavorable (low) force ratio determines a low move (advance) rate. As the force ratio becomes favorable, the rate increases.

TABLE IV-6, Supplemental Descriptions for Data Block AA (Columns A-F)

<u>Number of Entries</u>: One entry per unit. No more than 257 (Blue and Red) units can be entered.*

Entry Column	Description
A	Only units (in groups) that are initially committed are set to zero here. Others have this flag set to '1'. The units coded '0' here must exactly correspond with those with zero entries in column N of data block BA and with those units with a '1' in column I of data block CA. Battalion headquarters and artillery battalions should be coded '1'.
B	If column A has a '0', enter from data block BA the index of the group which contains this unit. If column A has a '1', enter from data block CA the index of the pattern containing this unit.
C	Table IV-1 displays a key to the unit types currently used in model applications. Unit type codes are used to index many data blocks.
D	Units 1 through 121 are flagged '1'. The limit 121 is equal to line 38 minus 1 where line 38 is from data block CC.
E	The units are km.
F	TO&E Type Designator

The units shown include three units at division (1, 2 and 3), a brigade headquarters (unit 4), a battalion headquarters (unit 5), three line companies (units 6, 7 and 8) and an artillery battalion (unit 9). All of the line companies are initially committed.

*Only entries for 25 units are illustrated.

UNIT NUMBER [I]	A	B	C	D	E
	GROUP/PATTERN FLAG. ALL UNITS ARE ASSIGNED TO A PATTERN, AND ALL UNITS WHICH MAY MEET THE ENEMY ARE ASSIGNED POSITIONS IN A FRONT LINE GROUP. UNITS IN GROUPS IN RESERVE MUST HAVE A "1". COMMITTED FRONT LINE UNITS MUST HAVE A "0".	GROUP/PATTERN INDEX. THE INDEX OF THE GROUP OR PATTERN TO WHICH THIS UNIT IS INITIALLY ASSIGNED.	THE NUMBER, FROM 1 TO 10, ASSIGNED TO THIS TYPE UNIT FOR THIS PROBLEM.	UNIT MODE. AT THE PRESENT TIME THERE ARE TWO UNIT MODES: 1 FOR ATTACKER, 2 FOR DEFENDER.	UNIT RADIUS. THE DEPLOYMENT RADIUS OF THE UNIT MEASURED IN KILOMETERS. (THE RADIUS ESSENTIALLY IS 1/2 THE SECTOR WIDTH FOR THE UNIT WHEN COMMITTED. IT SHOULD NOT OVERLAP OTHER UNITS. IN ADDITION THE RADIUS INFLUENCES THE EFFECT OF ENEMY ARTILLERY AS THIS IS BASED ON DENSITY OF MEN/MATERIAL PER SQ. UNIT OF MEASURE. THUS A UNIT WITH A SMALL RADIUS WILL RECEIVE MORE CASUALTIES FROM ENEMY ARTILLERY).
	[UNTPGF]	[UNTPTG]	[UNTYPE(I,1)]	[UNTYPE(I,2)]	[UNRDUS]
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

TIN001 DATA BLOCK AA

F

UNIT NUMBER [I]	UNIT NAME (UP TO 16 CHARACTERS) [UNIT NAME]
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	

TIN002

DATA BLOCK AA

TABLE IV-7, Supplemental Descriptions for Data Block AAA

Number of Entries: One value per entry.

Entry Column	Description
A, B	Conventionally, map north is in the direction of increasing Y coordinates. These entries serve as a base (origin) for the terrain input (data block RA).

It is not necessary that the base coordinates end with zero. The diagrammatic explanation on the data form should be read.

COORDINATES OF THE LOWER LEFT HAND CORNER OF THE GAME MAP. THIS IS THE POINT FOR SIMULATION COORDINATES WHERE X=0 AND Y=0. THIS X–Y ORIGIN IS USED IN THE COMPUTER TO CONVERT ACTUAL MAP COORDINATES TO SIMULATION COORDINATES FOR USE IN THE PROGRAMS. THESE SIMULATION COORDINATES ARE RECON-*VERTED TO ACTUAL MAP COORDINATES IN ALL OUTPUTS.*

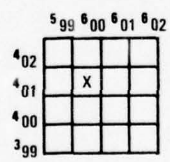
A

X COORDINATE
(XMPORG)

B

Y COORDINATE
(YMPORG)

NOTE: IF THE COORDINATES ARE TAKEN OFF A STANDARD MILITARY MAP (1:50,000) THEN THE SMALL NUMBER PRINTED TO THE LEFT AND SLIGHTLY ABOVE THE LARGER GRID SQUARE NUMBER MUST BE INCLUDED.



THE COORDINATES FOR THE POINT "X" ARE 5995 4015.

TABLE IV-8, Supplemental Descriptions for Data Block AB

Number of Entries: One for each weapon/object type in each unit. At most, 12 weapon types and three object types can be used in each force. While a maximum of 257 units can be simulated, the sample form shows only the first 15 units.

Entry Columns	Description
1-15	The weapon types used in current model applications are displayed in Tables IV-2 and IV-3. The thirteenth column represents high visibility objects; the fourteenth column represents medium visibility objects, and the fifteenth column represents low visibility objects. The weapon type codes represented by the column numbers of this block are referenced in numerous data blocks. The last three types (13-15) are always objects and never enter into firepower determinations.

Of the nine units represented in data block AA, only units 6 and 7 possess tanks, each owning 17 M-60 Al (from Table IV-2). The third line company, unit 8, has six M-551 Sheridans, 12 TOW and 45 DRAGON weapons. The weapon mix shown agrees with the basic function of the unit as implied by the unit type (column C in AA). In the example, only the first two listed line companies (units 6 and 7) were tank units, hence the association with weapon types one and two. The TOE of a unit should be used to develop inputs for data block AB.

THE FIRST TWELVE COLUMNS REFER TO WEAPON TYPES. COLUMNS 13, 14, 15 REFER TO EQUIPMENT (OTHER THAN WEAPONS) WHICH MAY BE VISIBLE TO THE ENEMY. A COUNT IS MADE OF WEAPONS AND OTHER EQUIPMENT FOR EACH ORGANIZATION IN THE SIMULATION UNIT AND THE TOTAL FOR THE UNIT IS ENTERED.

UNIT NUMBER (I)	1	2	3	4	5	6	7	8	9	10	11	12	13 (HIGH VIS)	14 (MED VIS)	15 (LOW VIS)
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															

HIGH VIS = TANKS, 2½ TON & LARGER TRUCKS, VTR ETC.
MED VIS = APC, TRUCKS 1¼ TON, ¾ TON, SP ARTY, TOWED ARTY ETC.
LOW VIS = ¼ TON, SMALL TRAILERS ETC-NOT CRITICAL TO THE SIMULATION
NOTE: 12 WEAPON TYPES NEED NOT BE PLAYED BUT HIGH, MEDIUM & LOW VISIBILITY ITEMS MUST BE IN COLS 13–15.

(WEAPST)

TIN003-8

DATA BLOCK A8

TABLE IV-9, Supplemental Descriptions for Data Block AT (Column A)

Number of Entries: *One value for each weapon/object type in* each unit type in the Blue force.

Entry Column	Description
A	These values are modifiers of the combat value (block EB) of the Blue weapons. The purpose is to increase or decrease the weight (value as artillery target) according to the tactical importance and also according to the particular vulnerability to artillery fire. The larger the value entered here, the more desirable the (Blue) weapon is as an artillery target.

A

UNIT TYPE
(I)

WEAPON TYPE (BLUE)

		1	2	3	4	5	6	7	8	9	10
	1										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										
	11										
	12										
HIGH VISIBILITY	13										
MEDIUM VISIBILITY	14										
LOW VISIBILITY	15										

THESE VALUES ARE USED TO DETERMINE WHAT ARTILLERY, IF ANY, WILL BE FIRED AT THE ENEMY UNIT. ENTER A VALUE BETWEEN 0 AND 9999.

THIS IS USED TO DETERMINE THE AMOUNT OF ARTILLERY FIRE TO BE DELIVERED. THEREFORE, THE HIGHER THE NUMBER, THE MORE DESIREABLE THE TARGET.

TIN004 A

DATA BLOCK AT

(ARTWT)

TABLE IV-10, Supplemental Descriptions for Data Block AT (Column B)

Number of Entries: One value for each weapon/object type in each unit type in the Red force.

Entry Column	Description
B	Analogous to column A, but these rate Red weapons as targets of Blue artillery.

Only one row and three columns are filled in because this is an example. If a given unit type does not possess a particular weapon, a zero value has been entered in block AT. The most noteworthy aspect of the Blue example entries (column A) is that the 81mm mortar (weapon 7) in Blue tank units is a highly desirable target for Red artillery. In the Red example entries, the BMP (weapon 8) in Red tank units is a most desirable target for Blue artillery.

B

UNIT TYPE
(I)

WEAPON TYPE (RED)	1	2	3	4	5	6	7	8	9	10
1	.	.	.	.	.	.	.	.	.	.
2	.	.	.	.	.	.	.	.	.	.
3	.	.	.	.	.	.	.	.	.	.
4	.	.	.	.	.	.	.	.	.	.
5	.	.	.	.	.	.	.	.	.	.
6	.	.	.	.	.	.	.	.	.	.
7	.	.	.	.	.	.	.	.	.	.
8	.	.	.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.	.	.
10	.	.	.	.	.	.	.	.	.	.
11	.	.	.	.	.	.	.	.	.	.
12	.	.	.	.	.	.	.	.	.	.
HIGH VISIBILITY 13	.	.	.	.	.	.	.	.	.	.
MEDIUM VISIBILITY 14	.	.	.	.	.	.	.	.	.	.
LOW VISIBILITY 15	.	.	.	.	.	.	.	.	.	.

THESE VALUES ARE USED TO DETERMINE WHAT ARTILLERY, IF ANY, WILL BE FIRED AT THE ENEMY UNIT. ENTER A VALUE BETWEEN 0 AND .9999.

THIS IS USED TO DETERMINE THE AMOUNT OF ARTILLERY FIRE TO BE DELIVERED. THEREFORE, THE HIGHER THE NUMBER, THE MORE DESIREABLE THE TARGET.

TIN004-B

DATA BLOCK AT

(ARTWT)

TABLE IV-11, Supplemental Descriptions for Data Block BA (Columns A and B)

Number of Entries: There are as many entries per column as there are groups. There can be no more than 25 groups. The last six numbered groups must be GS artillery battalions.

Entry Column	Description
Group/ FDC Index	This entry cross-references with the group index entries of column B of block AA, the group index entries of column B of block CA, entry D of block BC and entry K of block PA. The latter is the means by which the simulation associates a group with a specific brigade and battalion. Groups are described more fully in Chapter II, section 4.
A	When a group represents the line elements of a combat battalion, this entry should be the battalion CP.
B	With a group representing a battalion, this entry is the battalion tactical CP. Entries A and B, as well as all unit entries must have been defined in data blocks AA and AB.

GROUP/FDC COMBINED INDEX [I]

	A	B		A	B
	THE UNIT NUMBER OF THE GROUP CP (BN MAIN CP).	THE UNIT NUMBER OF THE GROUP'S ALTERNATE CP.		(CONT'D)	(CONT'D)
	[GPFDCI-LEFT HALF]	[GPFDCI-RIGHT HALF]		[GPFDCI-LEFT HALF]	[GPFDCI-RIGHT HALF]
1			14		
2			15		
3			16		
4			17		
5			18		
6			19		
7			20		
8			21		
9			22		
10			23		
11			24		
12			25		
13					

TIN005-A

DATA BLOCK BA

TABLE IV-12, Supplemental Descriptions for Data Block BA (Columns C-E)

Number of Entries: There are as many entries per column as there are groups. There can be no more than 25 groups. The last six numbered groups must be GS artillery battalions.

Entry Column	Description
C, D	Entry C must be a direct support FDC, except for the last six indexed groups of BA. For these, each of the first three must be a Blue GS battalion, and each of the last three must be a Red GS battalion. Entry D must cross-reference with the FDC index of data blocks BB and QA. For regular groups (as opposed to GS battalions), entry D must be the index in data block BB corresponding to the DS FDC specified by entry C.
E	For each GS battalion (in the last six groups) this entry cross-references with the subcolumn index of column C in data block EC. Example GS artillery types are shown in Table IV-4.

C

THE UNIT NUMBER OF THE DIRECT SUPPORT ARTILLERY FDC. AFTER ALL DIRECT SUPPORT ARTILLERY FDC's ARE ENTERED, THIS COLUMN CONTAINS THE UNIT NUMBER OF THE GENERAL SUPPORT ARTILLERY FDC's IN THE PROBLEM.

D

FDC INDEX, WHICH SHOULD CORRESPOND TO THE INDEX NUMBER IN COLS. 1–3 ON FORM BB.

E

ARTILLERY TYPE. (GENERAL SUPPORT ARTILLERY ONLY). EACH TYPE OF GENERAL SUPPORT ARTILLERY, i.e., 105 mm, 155 mm, H.J., etc., IS ASSIGNED A NUMBER, AND EACH GENERAL SUPPORT ARTILLERY BATTALION IN THE PROBLEM IS CODED AS TO WHICH TYPE OF ARTILLERY IT CONTAINS.

GROUP/FDC COMBINED INDEX	[GPFDC2]	[GPFDC3]	[GSATYP]
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

TIN005-B

DATA BLOCK BA

TABLE IV-13, Supplemental Descriptions for Data Block BA (Columns F-I)

Number of Entries: There are as many entries per column as there are groups. There can be no more than 25 groups. The last six numbered groups must be GS artillery battalions.

Entry Column	Description
F	The initial location of the group centroid at time zero.
G	Groups that do not have line units initially committed are mode 3 = reserve. Attacker groups are of mode 3 or mode 7 (attack) only. The other group modes should be used only for defender groups. Group modes are described in Table IV-6.
H	This entry represents the deployment radius (km) of the cluster of units comprising the group.
I	The route selection algorithm draws a line between the initial location of a group and the group final objective. Then it uses this entry to create a 'tunnel' (or sector) about this line such that the selected route must stay within the 'tunnel'. The width of the sector is given by entry I. Width is in grid squares which usually equate to kilometers.

	F		G	H	I
	GENERALLY, THE "CENTER OF MASS" OF THE GROUP.		GROUP MODE. 1= WITHDRAWL; 2 = LEAPFROG; 3 = RESERVE; 4 = YIELD; 5 = PATTERN (SEE COMMENTS); 6 = STATIC DEFENSE (HOLD); 7 = ATTACK.	GROUP DEPLOYMENT RADIUS. THE RADIUS, MEASURED IN KILOMETERS, OF THE AREA OCCUPIED BY THE GROUP.	INDICATE (IN GRID SQUARES) FOR EACH GP THE WIDTH OF THE SECTOR WITHIN WHICH IT MUST SELECT ITS ATTACK OR WITHDRAWL ROUTE.
	REFERENCE POINT COORD FOR GROUP				
GROUP NUMBER [I]	[GRPCRD (I, 1)] X	[GRPCRD (I, 2)] Y	[GPMODE(I,1)]	[GRPRAD]	[GRPWID]
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					

TIN005-C

DATA BLOCK BA

TABLE IV-14, Supplemental Descriptions for Data Block BA (Column J)

Number of Entries: There are as many entries per column as there are groups. There can be no more than 25 groups. The last six numbered groups must be GS artillery battalions.

Entry Column	Description
J	This entry is for an intermediate group objective between the initial group location and the final objective. Current model applications do not use this field.

J

COORDINATES OF DESIRED OBJECTIVE OR HOLDING POSITION.

[INTOBJ]

GROUP NUMBER [I]	X	Y
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		

TIN005-D

DATA BLOCK BA

TABLE IV-15, Supplemental Descriptions for Data Block BA (Column K)

<u>Number of Entries</u>: There are as many entries per column as there are groups. There can be no more than 25 groups. The last six numbered groups must be GS artillery battalions.

Entry Column	Description
K	There can be no more than four companies per group. Unit numbers entered here should cross-reference with the unit list of blocks AA and AB.

K

[CONAME]

UNIT NUMBER FOR COMPANY J OF GROUP I

THIS MUST AGREE WITH THE UNIT NUMBER OF THE UNIT IN THE CORRESPONDING PUNMUV (PATTERN) POSITION.

COMPANY NUMBER (J)

GROUP NUMBER [I]	1	2	3	4
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				

TIN005-E

DATA BLOCK BA

TABLE IV-16, Supplemental Descriptions for Data Block BA (Column L)

Number of Entries: There are as many entries per column as there are groups. There can be no more than 25 groups. The last six numbered groups must be GS artillery battalions.

Entry Column	Description
L	This entry cross-references with entries C-F of data block DA, with entry C of block EG and with entry D of block LB.

L

[COSTYP]

SURVEILLANCE INDEX: INDICATES THE TYPE OF SURVEILLANCE EQUIPMENT IN THIS UNIT. IT IS USED TO LOOK UP INFORMATION IN THE "SURVEILLANCE TYPE" LIST.

COMPANY NUMBER (J) (AS ON TIN005-E)

GROUP NUMBER (I)

	1	2	3	4
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				

TIN005-F

DATA BLOCK BA

TABLE IV-17, Supplemental Descriptions for Data Block BA (Column M)

Number of Entries: There are as many entries per column as there are groups. There can be no more than 25 groups. The last six numbered groups must be GS artillery battalions.

Entry Column	Description
M	The direction of movement is associated with increasing values of X.

M

[CODPOS]

THE DESIRED LATERAL SPACING BETWEEN THIS UNIT AND THE GROUP CENTER, MEASURED IN KILOMETERS, PLUS (+) IF DEPLOYED TO THE RIGHT OF GROUP CENTER, AND MINUS (–) IF TO THE LEFT, TAKEN FACING IN THE DIRECTION OF MOVEMENT.

COMPANY NUMBER (J) (AS ON TIN005-E)

GROUP NUMBER [I]

	1	2	3	4
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				

TABLE IV-18, Supplemental Descriptions for Data Block BA (Column N)

Number of Entries: There are as many entries per column as there are groups. There can be no more than 25 groups. The last six numbered groups must be GS artillery battalions.

Entry Column	Description
N	This entry cross-references with column A of block AA and entry I of block CA.

The example shown in Tables IV-11 through IV-18 illustrates entries for one basic group and for one GS battalion. Group 1 has line units 6, 7 and 8 (see block AB for unit names). Group headquarters is unit 5 with an alternate CP at unit 22. The supporting DS FDC is unit 9. All three line units are initially committed (entry N). The group mode is attack (mode 7). The deployment radius of the group is .9 km. Each unit of the group is equipped with surveillance device type 1. The route of the group is restricted to a sector of width 3 km centered on the line between initial deployment and final objective. Since the last six groups must be GS battalions, unit 104 is a GS artillery unit of artillery type 2.

N

[COSTAT]

IF UNIT IS INITIALLY COMMITTED, STATUS IS 0. IF IT IS A RESERVE UNIT, ITS STATUS IS 2.

COMPANY NUMBER (J) (AS ON TIN005-E)

GROUP NUMBER [I]

	1	2	3	4
1	☐	☐	☐	☐
2	☐	☐	☐	☐
3	☐	☐	☐	☐
4	☐	☐	☐	☐
5	☐	☐	☐	☐
6	☐	☐	☐	☐
7	☐	☐	☐	☐
8	☐	☐	☐	☐
9	☐	☐	☐	☐
10	☐	☐	☐	☐
11	☐	☐	☐	☐
12	☐	☐	☐	☐
13	☐	☐	☐	☐
14	☐	☐	☐	☐
15	☐	☐	☐	☐
16	☐	☐	☐	☐
17	☐	☐	☐	☐
18	☐	☐	☐	☐
19	☐	☐	☐	☐

TIN005-H

DATA BLOCK BA

TABLE IV-19, Supplemental Descriptions for Data Block BB (Column A)

Number of Entries: Exactly 12 entries per column are needed. The user should use exactly 12 FDC in the simulation.

Entry Column	Description
A	'Tubes' refer to the total number of tubes in all batteries of the battalion. Mission length is in minutes. This entry, FDCQ (or Q) is a measure of the total firepower available to the battalion.

The destructiveness of each FDC during a mission is represented by a FDCQ value of 216. Such a value would reflect, for example, a FDC with the following characteristics:

1. The FDC has 18 tubes of 155mm artillery.

2. The round value of a 155mm round is equal to 2.0 rounds of 105mm (in terms of lethal area).

3. FDC mission length is six minutes.

4. During a mission, each tube fires one round per minute.

Under these conditions, the FDCQ value is computed as follows:

18 (tubes) x 1 (rnd/min/tube) x 2 (105mm equiv rnds) x 6 (mission length [min])

There are many other types of FDC that would also yield an FDCQ of 216.

A

FDC
(LIST DS ARTY FIRST THEN GS)
[1]

		FDCQ
BLUE DS	1	☐☐☐.☐
	2	☐☐☐.☐
	3	☐☐☐.☐
RED DS	4	☐☐☐.☐
	5	☐☐☐.☐
	6	☐☐☐.☐
BLUE GS	7	☐☐☐.☐
	8	☐☐☐.☐
	9	☐☐☐.☐
RED GS	10	☐☐☐.☐
	11	☐☐☐.☐
	12	☐☐☐.☐

A MEASURE OF ARTILLERY FIRE. Q = (TUBES) X (ROUNDS PER MINUTE PER TUBE) X (ROUND VALUE) X MISSION LENGTH. ROUND VALUE IS EQUAL TO THE RATIO OF THE LETHAL AREA OF ONE OF THESE ROUNDS TO THE LETHAL AREA OF A 105 MM ROUND.

TIN006-A

DATA BLOCK BB

TABLE IV-20, Supplemental Descriptions for Data Block BB (Columns B-E)

Number of Entries: Exactly 12 entries per column are needed. The user should use exactly 12 FDC in the simulation.

Entry Column	Description
B	There can be no more than four batteries in any one battalion.
C	This entry should be zero.
D	This entry determines only the duration, not the intensity of fire for a fire mission.
E	This entry affects time only.

DATA BLOCK BB

FDC

LIST DS ARTY FIRST, THEN GENERAL SUPPORT.

FDC		B FDCTYM(I,1)	C FDCTYM(I,2)	D FDCTYM(I,3)	E FDCTYM(I,4)
BLUE DS	1				
	2				
	3				
RED DS	4				
	5				
	6				
BLUE GS	7				
	8				
	9				
RED GS	10				
	11				
	12				
		NUMBER OF BATTERIES IN THIS FDC.	TIME IN MINUTES BETWEEN DECISION TO FIRE AND ACTUAL START OF FIRING. SET TO ZERO AND ADD THIS TIME TO POST-MISSION DELAY.	MISSION LENGTH. THE AVERAGE DURATION OF A FIRE MISSION, IN MINUTES.	TIME IN MINUTES AFTER A MISSION BEFORE THE BATTERY IS AVAILABLE AGAIN. SET EQUAL TO PRE-MISSION DELAY PLUS POST-MISSION DELAY.

TIN006-B

TABLE IV-21, Supplemental Descriptions for Data Block BB (Columns F and G)

Number of Entries: Exactly 12 entries per column are needed. The user should use exactly 12 FDC in the simulation.

Entry Column	Description
F	Always set to 100 percent.
G	This entry is the fraction of the ammunition level consumed per minute of firing.

FDC
(LIST DS ARTY FIRST THEN GS)

		F FDCAMO (SCALE 2)	G FDCRAT (SCALE 5)
BLUE DS	1		
	2		
	3		
RED DS	4		
	5		
	6		
BLUE GS	7		
	8		
	9		
RED GS	10		
	11		
	12		

PERCENT OF AMMO AVAILABLE. MUST BE A NORMAL FULL SUPPLY.

AMMO USE RATE – THE AMOUNT (IN PERCENT) THE AMMO LEVEL IS REDUCED AFTER A MINUTE OF FIRING.

TABLE IV-22, Supplemental Descriptions for Data Block BB (Column H)

Number of Entries: Exactly 12 entries per column are needed. The user should use exactly 12 FDC in the simulation.

Entry Column	Description
H	This entry should be the nominal range of the battery. A battery has full fire effectiveness only to its nominal range. No unit is targeted by an artillery battery if it is out of range.

H

RANGE OF THE BATTERY IN KILOMETERS

FIRING BATTERY

FDC
(LIST DS ARTY FIRST THEN GS)

	[I]	1	2	3	4
BLUE DS	1	.	.	.	.
	2	.	.	.	.
	3	.	.	.	.
RED DS	4	.	.	.	.
	5	.	.	.	.
	6	.	.	.	.
BLUE GS	7	.	.	.	.
	8	.	.	.	.
	9	.	.	.	.
RED GS	10	.	.	.	.
	11	.	.	.	.
	12	.	.	.	.

[FDCRNG(I,J,2),LEFT HALF]

TABLE IV-23, Supplemental Descriptions for Data Block BB (Column I)

Number of Entries: Exactly 12 entries per column are needed. The user should use exactly 12 FDC in the simulation.

Entry Number	Description
I	Unless a target weight computes to this value or greater, the FDC will not permit artillery to fire on it.

I

A CUTOFF USED TO DETERMINE IF IT IS WORTHWHILE TO FIRE THIS BATTERY AGAINST AN ENEMY UNIT.

FIRING BATTERY

FDC (LIST DS ARTY FIRST THEN GS)

		1	2	3	4
BLUE DS	1				
	2				
	3				
RED DS	4				
	5				
	6				
BLUE GS	7				
	8				
	9				
RED GS	10				
	11				
	12				

TIN006-E (FDCRNG [I, J,1]) DATA BLOCK BB

TABLE IV-24, Supplemental Description for Data Block BB (Column J)

Number of Entries: Exactly 12 entries per column are needed. The user should use exactly 12 FDC in the simulation.

Entry Number	Description
J	An FDC may allocate fewer than full force against a target. The fraction of that force possessed by each battery is given here. The sum of the fractional parts, taken over all batteries, should be one for each FDC.

The example describes the first Blue DS FDC that, from columns C and D of block BA, is known to be unit 9. In addition, the example describes the GS FDC with index 7, which, after referring to columns C and D of block BA, is known to be unit 104 for group 20. Both of these FDC are identically described in block BB. Each has three batteries, each contributing equally to total FDC firepower and possessing a nominal range of 14.6 km. Each fire mission is six minutes long and consumes .6 percent of the initial stock of ammunition. After a mission, the FDC requires six minutes to set up for a new mission.

J

THE FRACTIONAL PART OF THE FDC'S 105 EQUIV. ROUNDS REPRESENTED BY THIS BATTERY.

FIRING BATTERY

FDC (LIST DS ARTY FIRST THEN GS)

		1	2	3	4
BLUE DS	1				
	2				
	3				
RED DS	4				
	5				
	6				
BLUE GS	7				
	8				
	9				
RED GS	10				
	11				
	12				

FDCFRC

TABLE IV-25, Supplemental Descriptions for Data Block BC/BD

Number of Entries: A pair of coordinates for entries A and B, otherwise one value per entry.

Entry Column	Description
A	The GOP objective should be near the rear of the Red defender force.
B	This is an offset of the GOP group center from the pattern given in entry F. After the GOP is decommitted, it follows the pattern (entry F) at the specified offset.
C	See entry B above.
D	Cross-references with the index column of block BA. This field identifies the group (in BA) which is the GOP.
E	Cross-references with the index column of block CA.
F	Deployments should be structured so that the GOP can follow (as opposed to lead) this pattern after the former is decommitted.

In the example, the GOP corresponds to group 12 and pattern 22. The GOP will decommit when it comes within 2.5 km of its assigned objective (501,624). After decommitment the GOP will follow pattern 26.

A	X–Y COORDINATES OF GOP GP. FINAL OBJECTIVE, WHICH IS LOCATED ON THE FEBA. ONE SET OF COORDINATES IS PROVIDED FOR EACH GOP GP. AFTER REACHING THIS POINT, THE GOP IS DECOMMITTED AS A GP AND MOVES TO THE REAR AS A PATTERN.	GOPDST (1, 1) GOPDST (1, 2)	X ☐☐☐.☐ Y ☐☐☐.☐
B	DESCRIBES THE FOLLOW POINT (DISTANCE AND DIRECTION FROM FOLLOW PATTERN NO.) THAT THE PATTERN WILL FOLLOW AFTER DECOMMITMENT.	GOPDST (1, 3) GOPDST (1, 4)	DELTA X ☐☐☐.☐ DELTA Y ☐☐☐.☐
C	WHEN THE GROUP INVOLVED GETS THIS CLOSE TO ITS OBJECTIVE, SUBROUTINE GOPOUT BECOMES EFFECTIVE, THE GROUP IS DECOMMITTED, AND AS A PATTERN PROCEEDS TO ITS DESIGNATED POSITION IN REAR AREA. (DISTANCE IN KMS).	[GOPDST (1, 5)]	☐.☐
D	THE NUMBER OF THE FRONT LINE GROUP THAT THIS ROW OF DATA PERTAINS TO.	[GOPNDX (1, 1)]	☐☐
E	THE NUMBER OF THE PATTERN THAT IS ASSOCIATED WITH THIS GROUP.	[GOPNDX (1, 2)]	☐☐
F	WHEN THE GROUP AND PATTERN ARE DECOMMITTED, THE PATTERN IS ASSIGNED A FOLLOW POINT COMPUTED FROM AND BASED ON THIS FOLLOW PATTERN NUMBER.	[GOPNDX (1, 3)]	☐☐

NOTE: GOP COMPANIES MUST ALL BE IN ONE GROUP (MAX OF 4). OTHER UNITS (NOT "LINE COMPANIES") CAN BE IN THE GOP PATTERN (MAX OF 10 COUNTING THE "LINE COMPANIES")

TABLE IV-26, Supplemental Descriptions for Data Block CA (Columns A and B)

Number of Entries: There can be no more than 40 patterns. Within each pattern there can be no more than 10 units. The total number of units in the simulation is limited to 257. Every unit must be in a pattern and so must be mentioned in this data block.

Entry Column	Description
Index	The pattern indexes of this block must cross-reference with block AA (column B), block BD (entries E and F), and block PA (entry L).
A	Pattern of types 0 and 1 will have a group index in column B. Patterns of type 2 will have a pattern index in column B.
B	In this data block, follow 'chains' may be constructed, e.g., pattern 1 may follow pattern 6 which, in turn, may follow pattern 7, which may follow group 2. In such a chain, the last entity followed must be a group.

PATTERN INDEX NUMBER. EACH PATTERN IS ASSIGNED A NUMBER WHICH ENABLES THE COMPUTER TO DETERMINE WHICH DATA APPLIES TO WHICH PATTERN. THE BLUE PATTERNS ARE NUMBERED CONSECUTIVELY STARTING WITH ONE, AND THE RED PATTERNS ARE NUMBERED STARTING WITH THE FIRST NUMBER NOT ASSIGNED TO A BLUE PATTERN.

[I]

A

PATTERN TYPE. DEFINES HOW THE PATTERN MOVES, AND IF THE PATTERN FOLLOWS, OR PUSHES A GROUP OR ANOTHER PATTERN. PATTERNS DO NOT HAVE ROUTES, BUT FOLLOW OR PUSH GROUPS (WHICH DO HAVE ROUTES) OR ANOTHER PATTERN WHICH IS FOLLOWING OR PUSHING A GROUP.

[PTRNTP(I,1)]

I		I	
1		26	
2		27	
3		28	
4		29	
5		30	
6		31	
7		32	
8		33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

B

THE FOLLOW INDEX IS THE GROUP NUMBER THAT THIS PATTERN IS FOLLOWING OR PUSHING IF IT IS PATTERN TYPE 0 OR 1, OR THE PATTERN NUMBER BEING FOLLOWED OR PUSHED IF THE PATTERN TYPE IS 2 OR 3.

[PTRNTP(I,2)]

I		I	
1		26	
2		27	
3		28	
4		29	
5		30	
6		31	
7		32	
8		33	
9		34	
10		35	
11		36	
12		37	
13		38	
14		39	
15		40	
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

TYPE 0 = PATTERN MOVES CONTINUOUSLY AND FOLLOWS OR PUSHES A GROUP.

TYPE 1 = PATTERN MOVES BY BOUNDS AND FOLLOWS OR PUSHES A GROUP.

TYPE 2 = PATTERN MOVES CONTINUOUSLY AND FOLLOWS OR PUSHES ANOTHER PATTERN.

TYPE 3 = PATTERN MOVES BY BOUNDS AND FOLLOWS OR PUSHES ANOTHER PATTERN.

TIN008-A

TABLE IV-27, Supplemental Descriptions for Data Block CA (Columns C and D)

Number of Entries: There can be no more than 40 patterns. Within each pattern there can be no more than 10 units. The total number of units in the simulation is limited to 257. Every unit must be in a pattern and so must be mentioned in this data block.

Entry Column	Description
C	The start distance (for patterns of type 1 or 3) is the distance that the pattern allows the group (or pattern) it follows to precede it before the pattern is displaced.
D	This item is used to determine whether units in the pattern might be in contact with enemy units. The radius of the pattern should be sufficiently large to account for all units of the battalion when deployed for combat.

C

[PTRNRT]

PATTERN NUMBER [I]

1	__ __ . __ __	26	__ __ . __ __
2	__ __ . __ __	27	__ __ . __ __
3	__ __ . __ __	28	__ __ . __ __
4	__ __ . __ __	29	__ __ . __ __
5	__ __ . __ __	30	__ __ . __ __
6	__ __ . __ __	31	__ __ . __ __
7	__ __ . __ __	32	__ __ . __ __
8	__ __ . __ __	33	__ __ . __ __
9	__ __ . __ __	34	__ __ . __ __
10	__ __ . __ __	35	__ __ . __ __
11	__ __ . __ __	36	__ __ . __ __
12	__ __ . __ __	37	__ __ . __ __
13	__ __ . __ __	38	__ __ . __ __
14	__ __ . __ __	39	__ __ . __ __
15	__ __ . __ __	40	__ __ . __ __
16	__ __ . __ __		
17	__ __ . __ __		
18	__ __ . __ __		
19	__ __ . __ __		
20	__ __ . __ __		
21	__ __ . __ __		
22	__ __ . __ __		
23	__ __ . __ __		
24	__ __ . __ __		
25	__ __ . __ __		

MOVE RATE IF PATTERN MOVES CONTINUOUSLY (TYPE 0 OR 2). START DISTANCE IF PATTERN MOVES BY BOUNDS (TYPE 1 OR 3). IF THE PATTERN MOVES CONTINUOUSLY THE DISTANCE, MEASURED IN KILOMETERS, THAT THIS PATTERN IS TO MOVE IN A ONE MINUTE PERIOD IS ENTERED.

IF THE PATTERN MOVES BY BOUNDS, THE MAXIMUM DISTANCE, MEASURED IN KILOMETERS, THAT THIS PATTERN IS ALLOWED TO GET FROM THE PATTERN OR GROUP THAT IT FOLLOWS IS ENTERED.

D

[PTRNRD]

1	__ __ . __	26	__ __ . __
2	__ __ . __	27	__ __ . __
3	__ __ . __	28	__ __ . __
4	__ __ . __	29	__ __ . __
5	__ __ . __	30	__ __ . __
6	__ __ . __	31	__ __ . __
7	__ __ . __	32	__ __ . __
8	__ __ . __	33	__ __ . __
9	__ __ . __	34	__ __ . __
10	__ __ . __	35	__ __ . __
11	__ __ . __	36	__ __ . __
12	__ __ . __	37	__ __ . __
13	__ __ . __	38	__ __ . __
14	__ __ . __	39	__ __ . __
15	__ __ . __	40	__ __ . __
16	__ __ . __		
17	__ __ . __		
18	__ __ . __		
19	__ __ . __		
20	__ __ . __		
21	__ __ . __		
22	__ __ . __		
23	__ __ . __		
24	__ __ . __		
25	__ __ . __		

PATTERN RADIUS OF THE ITH PATTERN. THE DEPLOYMENT RADIUS OF THE PATTERN, MEASURED IN GRID SQUARES.

TIN008-B

DATA BLOCK CA

TABLE IV-28, Supplemental Descriptions for Data Block CA (Columns E-G)

Number of Entries: There can be no more than 40 patterns.* Within each pattern there can be no more than 10 units. The total number of units in the simulation is limited to 257. Every unit must be in a pattern and so must be mentioned in this data block.

Entry Column	Description
E	These should be the coordinates of the approximate centroid of the units comprising the pattern.
F	If the left entry is positive, then the indexed pattern follows at an offset to the left of the group or pattern of column B. If the entry is negative, the pattern follows on the right. If the right entry is positive, the indexed pattern follows at an offset below the followed group/pattern. If the entry is negative, the pattern follows at an offset above the followed group/pattern.
G	Always enter a zero value here.

*For illustrative purposes, only 25 patterns are shown on the form.

PATTERN NUMBER [I]	E [PTRNMV(I,1)] X	E [PTRNHV(I,2)] Y	F [PTRNHV(I,3)]	F [PTRNMV(I,4)]	G [PTRNHV(I,5)]
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

THE CONTROL POINT COORDINATES LOCATE ANY DESIRED REFERENCE POINT IN THE PATTERN. THE CONTROL POINT OF A PATTERN IS USED TO FIND A FOLLOW POINT FOR PATTERNS WHICH ARE PATTERN TYPE 2 OR 3. THE "FOLLOWING" PATTERN'S CONTROL POINT AIMS FOR A POINT THAT IS DELTA X, DELTA Y, FROM THE CONTROL POINT OF THE PATTERN OR GROUP BEING "FOLLOWED."

THE DELTA X–Y COORDINATES ARE VALUES THAT, DEPENDING ON THE SIGN, ARE ADDED TO OR SUBTRACTED FROM THE COORDINATES OF THE CONTROL POINT OF THE "FOLLOWED" PATTERN OR GROUP TO LOCATE A POINT TOWARDS WHICH THE CONTROL POINT OF THE "FOLLOWING" PATTERN IS MOVED.

STOP DISTANCE

TIN008-C

TABLE IV-29, Supplemental Descriptions for Data Block CA (Column H)

Number of Entries: There can be no more than 40 patterns.* Within each pattern there can be no more than 10 units. The total number of units in the simulation is limited to 257. Every unit must be in a pattern and so must be mentioned in this data block.

Entry Column	Description
H	If a group is contained within the pattern, the first units listed here must be those of the group. These initial units must also be listed in the order of the group list (block BA). A pattern should contain, at most, one group.

*For illustrative purposes, only 15 patterns are shown on the form.

H

PATTERN/UNIT NUMBER
[J]

PATTERN NUMBER
[I]

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										

THE UNIT NUMBER OF UNITS ASSIGNED TO THIS PATTERN. THIS <u>MUST</u> AGREE WITH THE UNIT SPECIFIED IN THE SAME POSITION IN GROUP INFORMATION (CONAME). ALL UNITS NOT IN GROUPS ARE LISTED AFTER THOSE IN GROUPS, E.G.

(NOTE CORRESPONDENCE OF UNIT NUMBERS.)

FORM BA		FORM CA	
GROUP	UNIT	PATTERN	UNIT
4	23	9	23
	24		24
	25		25
			21
			16
			49

T1N008-D

PUNMV

DATA BLOCK CA

TABLE IV-30, Supplemental Description for Data Block CA (Column I)

Number of Entries: There can be no more than 40 patterns.* Within each pattern there can be no more than 10 units. The total number of units in the simulation is limited to 257. Every unit must be in a pattern and so must be mentioned in this data block.

Entry Column	Description
I	This entry is '0' if the unit is initially in its pattern location (i.e., is uncommitted) and is '1' if the unit is initially at its group location (committed). This entry should cross-reference with column N of block BA (for units in groups) and with column A of block AA.

*For illustrative purposes, only 25 patterns are shown on the form.

I

PATTERN/UNIT NUMBER
[J]

PATTERN NUMBER
[I]

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

TIN008-E

NO ACTION FLAG—0 FOR PATTERN UNITS; 1 FOR GROUP UNITS

DATA BLOCK CA

PUNFLG (I, J,1)

TABLE IV-31, Supplemental Descriptions for Data Block CA (Column J)

Number of Entries: There can be no more than 40 patterns.* Within each pattern there can be no more than 10 units. The total number of units in the simulation is limited to 257. Every unit must be in a pattern and so must be mentioned in this data block.

Entry Column	Description
J	These are the coordinates of the initial deployment locations of the units.

*For illustrative purposes, only 14 patterns are shown on the form.

J

PATTERN/UNIT NUMBER
[J]

PATTERN NUMBER [I]

I		1	2	3	4	5	6	7	8	9	10
1	X										
	Y										
2	X										
	Y										
3	X										
	Y										
4	X										
	Y										
5	X										
	Y										
6	X										
	Y										
7	X										
	Y										
8	X										
	Y										
9	X										
	Y										
10	X										
	Y										
11	X										
	Y										
12	X										
	Y										
13	X										
	Y										
14	X										
	Y										

PATTERN UNIT COORDINATES
(PUNCRD(I,J,1) AND PUNCRD(I,J,2))

TIN008-F

DATA BLOCK CA

TABLE IV-32, Supplemental Descriptions for Data Block CA (Column K)

Number of Entries: There can be no more than 40 patterns.* Within each pattern there can be no more than 10 units. The total number of units in the simulation is limited to 257. Every unit must be in a pattern and so must be mentioned in this data block.

Entry Column	Description
K	Communications systems which are designated 'out when moving' will be down during the preparation period as well.

*For illustrative purposes, only 20 patterns are shown on the form.

K

PATTERN/UNIT NUMBER
[J]

PATTERN NUMBER [I]	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

A COUNT OF THE NUMBER MINUTES REQUIRED FOR THE UNIT TO TEAR DOWN AND PREPARE TO DISPLACE. THAT IS, THE TIME LAPSE BETWEEN RECEIVING AN ORDER TO DISPLACE AND ACTUALLY STARTING TO MOVE.

TIN008-G

PUNPRP (I, J,2)

DATA BLOCK CA

TABLE IV-33, Supplemental Descriptions for Data Block CA (Column L)

Number of Entries: There can be no more than 40 patterns. Within each pattern there can be no more than 10 units. The total number of units in the simulation is limited to 257. Every unit must be in a pattern and so must be mentioned in this data block.

Entry Column	Description
L	Communications systems which are designated 'out when moving' will be down during the emplacement period as well.

Pattern 1 moves continuously, following group 1. Its basic move rate is 18 km/hour and its deployment radius is 2 km. The pattern center is located at coordinates (482,638). The pattern tends to follow 1 km behind and .5 km above group 1. There are 10 units in the pattern. Note that pattern 1 contains the units of group 1 (6, 7 and 8) and that these units are listed at the beginning of the pattern unit list of CA in the same order they are listed in entry K of block CA. Only units 6, 7 and 8 are initially committed (and are so designated in column J). Most units of the pattern have displacement and emplacement delays of five minutes.

L

PATTERN/UNIT NUMBER
[J]

PATTERN NUMBER [I]

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

A COUNT OF THE NUMBER OF MINUTES REQUIRED FOR THE UNIT TO SET UP AND BECOME OPERATIONAL AFTER MOVING TO A NEW LOCATION.

TIN008-H PUNPRP (I, J, 1) DATA BLOCK CA

	1	2	3	4	5	6	7	8	9	10
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										

TABLE IV-34, Supplemental Descriptions for Data Block CC (Lines A-H)

Number of Entries: A single entry per line.

Line	Description
A, E	Entry A must be less than entry E.
B, F	Entry B must be less than entry F.
C, G	Entry C must be less than entry G.
D, H	Entry D must be less than entry H.

LINE NUMBER = 1

A	– WHEN A UNIT ON FOOT, WHOSE GROUP IS IN "ATTACK" MODE, HAS A FORCE RATIO LESS THAN THIS, IT DOES NOT MOVE.	1,1
B	– WHEN A UNIT IN VEHICLES, WHOSE GROUP IS IN "ATTACK" MODE HAS A FORCE RATIO LESS THAN THIS, IT DOES NOT MOVE.	2,1
C	– WHEN A UNIT ON FOOT, WHOSE GROUP IS IN "YIELD" MODE, HAS A FORCE RATIO LESS THAN IT RETREATS AS FAST AS THE TERRAIN WILL ALLOW.	3,1
D	– WHEN A UNIT IN VEHICLES WHOSE GROUP IS IN "YIELD" MODE HAS A FORCE RATIO LESS THAN THIS, IT RETREATS AS FAST AS THE TERRAIN WILL ALLOW.	4,1
E	– WHEN A UNIT ON FOOT WHOSE GROUP IS IN "ATTACK" MODE HAS A FORCE RATIO GREATER THAN THIS, IT ATTACKS AS FAST AS THE TERRAIN WILL ALLOW.	1,2
F	– WHEN A UNIT IN VEHICLES WHOSE GROUP IS IN "ATTACK" MODE HAS A FORCE RATIO GREATER THAN THIS, IT ATTACKS AS FAST AS THE TERRAIN WILL ALLOW.	2,2
G	– WHEN A UNIT ON FOOT WHOSE GROUP IS IN "YIELD" MODE HAS A FORCE RATIO GREATER THAN THIS, IT DOES NOT MOVE.	3,2
H	– WHEN A UNIT IN VEHICLES WHOSE GROUP IS IN "YIELD" MODE HAS A FORCE RATIO GREATER THAN THIS, IT DOES NOT MOVE.	4,2

TIN009-A

(FRMVCT [I, J])

DATA BLOCK CC

TABLE IV-35, Supplemental Descriptions for Data Block CC (Lines 2 and 6-9)

Number of Entries: A single entry per line, except for line 9 which has two entries, one for attacker and one for defender.

Line	Description
6-9	A unit's attrition-distance-time counter (ADTC) affects the frequency of status reports (used in line 2). The unit ADTC also reflects the recency of information sent from company to battalion. As such, it governs commitment of companies (as in sub-block V of data block PA and in line 7 of this data block).

Lines 2, 6, 7 and 9 - Every minute a unit's ADTC is incremented by 100 x last 5 min. attrition + .1 x distance moved (km) in last 5 min. + .001. The ADTC is reset to zero when a status report sent up is received by battalion. A high ADTC generally indicates an extended period without contact with higher headquarters. When a unit ADTC reaches 2.5, a status report to battalion is triggered.

	LINE NUMBER	
[ADTATT A (SCALE 4)]	6	A MEASURE OF STATUS CHANGE WHEN A UNIT'S STRENGTH HAS BEEN REDUCED BY ATTRITION. EACH TIME ATTRITION IS COMPUTED THE PRODUCT OF ADTATT TIMES THE ATTRITION FRACTION IS ADDED TO THE UNIT'S REPORT NUMBER. SEE ADTLIM.
[ADTCUT B (SCALE 4)]	7	HAS TO DO WITH COMMITTING RESERVE UNITS. WHEN THE GROUP IS LOOKING AT THE UNIT'S STATUS TO DECIDE WHETHER THE UNIT NEEDS HELP OR NOT, THE UNIT'S FORCE RATIO MAY BE EXAMINED ONLY IF THE UNIT'S REPORT NUMBER (THE ADTC NUMBER) IS LESS THAN ADTCUT.
[ADTDIS]	8	THIS IS A MEASURE OF STATUS CHANGE OF A UNIT WHICH IS ON THE MOVE. EACH TIME THE COMPUTER MOVES A UNIT, THE PRODUCT OF ADTDIS TIMES THE DISTANCE MOVED (IN KM) IS ADDED TO THE UNIT'S REPORT NUMBER (ADTC). IF, FOR EXAMPLE, A UNIT IS BEING MOVED BY A "ONE MINUTE" PROGRAM, AND THE MOVE TAKES 20 MINUTES, THIS VALUE IS USED 20 TIMES. SEE ADTLIM.
[ADTINC D (SCALE 4)]	9	THIS IS A MEASURE OF STATUS CHANGE OF A UNIT, NOT CONSIDERING MOVEMENT OR ATTRITION, IN THE LAST MINUTE. EACH MINUTE, THE UNIT'S REPORT NUMBER (ADTC) IS INCREASED BY ADTINC. SEE ADTLIM.
[ADTLIM(1) ADTLIM(2) (SCALE 4)]	2	WHEN THE ATTRITION, DISTANCE, TIME COUNTER (ADTC) REACHES THIS CUTOFF VALUE, A STATUS REPORT MESSAGE IS SENT TO HIGHER HEADQUARTERS; (1) VALUE FOR BLUE, (2) FOR RED.

TIN009-B

DATA BLOCK CC

TABLE IV-36, Supplemental Description for Data Block CC (Lines 10-18)

<u>Number of Entries</u>: A single entry per line.

Line	Description
10	This threshold triggers a message with a DLINE index of 3 (from data block NA).
11	This value should always be zero.
12	If the coordination level for a pair of units listed in data block KA falls below this value, a coordination message is generated. A coordination message has a DLINE index of 1 (from data block NA).
14	Use of this factor simulates the 'aging' of intelligence at division.
15,16,13	The use of these factors simulates the 'aging' of intelligence at echelons below division.
17	A stopped unit in leapfrog mode cannot start moving unless its force ratio is less than this value.
18	This threshold lessens the chance of rear elements of retreating groups outrunning the forward elements.

TACTICAL INPUT CONSTANTS

	LINE NUMBER		
[ARTNCT]	10	AN INTELLIGENCE CUTOFF VALUE. WHEN THE INTELLIGENCE LEVEL THAT AN ARTILLERY FORWARD OBSERVER HAS ACQUIRED SINCE THE LAST MESSAGE WAS SENT REACHES ARTNCT, A NEW MESSAGE IS GENERATED.	
[CORDI]	11	COORDINATION LEVEL INITIAL VALUE CONSTANT. SEE TFADE.	
[CORDT]	12	COORDINATION LEVEL CONSTANT. SEE TFADE.	
[FADEDV]	14	A CONSTANT USED TO FADE DIVISION AND BRIGADE INTELLIGENCE LOGS EVERY 15 MINUTES.	
[FADEFD]	15	A TIME FADE FACTOR BETWEEN 0 AND 1. EACH MINUTE OF PLAY, THE COMPUTER REPLACES THE VALUE OF EACH FIRE DIRECTION CENTER'S INTELLIGENCE LEVEL WITH THE PRODUCT OF ITS PREVIOUS VALUE TIMES FADEFD.	
[FADEGP]	16	EACH FIVE MINUTES THE INTELLIGENCE INFORMATION THAT A GROUP HAS ABOUT AN ENEMY UNIT IS SET EQUAL TO THE OLD ENTRY TIMES FADETGP.	
[FADELG]	13	LONG RANGE SURVEILLANCE CONSTANT. A TIME FADE FACTOR. EACH 15 MINUTE TIME PERIOD THE INTELLIGENCE LEVELS ON ENEMY UNITS AS PICKED UP AND RECORDED AT EACH SURVEILLANCE INSTALLATION ARE ALL REPLACED BY THE PRODUCT OF THE PREVIOUS VALUE TIMES FADELG.	
[FRLEAP]	17	FORCE RATIO CUTOFF TO DETERMINE IF A UNIT IN LEAPFROG MODE BEGINS TO MOVE.	
[FROGMV]	18	WHEN A UNIT IN A YIELD GROUP MODE BECOMES GREATER THAN THE MAXIMUM DESIRABLE DISTANCE FROM THE POINT TOWARD WHICH IT MOVES, ITS RATE IS MULTIPLIED BY FROGMV, AND IT MOVES AT THE RATE OF THIS PRODUCT UNTIL IT REACHES THE MINIMUM DESIRABLE DISTANCE FROM ITS RABBIT.	

TABLE IV-37, Supplemental Descriptions for Data Block CC (Lines 19-27, 30-32 and 53)

Number of Entries: A single entry per line.

Line	Description
19	This threshold triggers a message with a DLINE index of 2 (from data block NA).
20	The rate is in km/minute.
21	This value must cross-reference with all data blocks indexed by unit type.
53	The current model allows no more than three Blue brigades.
23	There is a limit of three Blue direct support artillery battalions in the current model.
24	Since there can be, at most, 19 groups in the current model, the number of Red groups is limited by this value.
25	There is a limit of three in the current model.
26	This item refers to units in data block LB.
27	Currently, at most, 40 patterns may be input.
30,31,32	The effect of varying this value is unknown. Increasing this value above that of the example is not recommended.

	LINE NUMBER	TACTICAL INPUT CONSTANTS	
[GNDINC]	19	WHEN THE INTELLIGENCE LEVEL THAT A UNIT HAS ACQUIRED SINCE THE LAST MESSAGE WAS SENT REACHES GNDINC A MESSAGE IS SENT TO THE BATTALION HEADQUARTERS. "CURRENT INTELLIGENCE LEVEL" IS REPLACED UPON COMPLETION OF THE MESSAGE BY THE SUM OF ITSELF PLUS INTELLIGENCE SINCE LAST MESSAGE MINUS THE PRODUCT OF THE TWO.	
[GOPRAT]	20	PATTERN MOVE RATE FOR DECOMMITTED GOP GROUPS.	
[IARTYP]	21	THE UNIT TYPE NUMBER ASSIGNED TO ARTILLERY UNITS.	
[IBBDLM]	22	NUMBER OF BLUE BRIGADES AND DIVISION, CURRENTLY EQUAL TO FOUR.	
[IBBGLM]	53	THE TOTAL NUMBER OF BLUE BRIGADES IN THE EXERCISE.	
[IBDSLM]	23	NUMBER OF BLUE DS ARTILLERY BATTALIONS.	
[IBGPLM]	24	NUMBER OF BLUE FRONT-LINE GROUPS IN THE EXERCISE.	
[IBGSLM]	25	NUMBER OF BLUE GS ARTILLERY BATTALIONS.	
[IBLRLM]	26	NUMBER OF BLUE LONG RANGE SURVEILLANCE UNITS.	
[IBPTLM]	27	NUMBER OF BLUE PATTERNS IN THE EXERCISE.	
[ICONLM]	30	THE MAXIMUM NUMBER OF UNITS WHICH COULD GET CLOSE ENOUGH TO ENEMY UNITS TO PERMIT INTERACTION. IT IS THE SECOND DIMENSION OF THE CONTACT LIST.	
[ICPTLM]	31	THE MAXIMUM NUMBER OF GROUPS OR PATTERNS WITH WHICH ONE GROUP OR PATTERN COULD INTERACT WITHIN ANY FIFTEEN MINUTE PERIOD.	
[ICPRLM]	32	THE MAXIMUM NUMBER OF UNIT PAIRS THAT COULD BE REQUIRED TO COORDINATE WITH EACH OTHER AT ANY ONE TIME DURING THE PROBLEM.	

TIN009-D

DATA BLOCK CC

TABLE IV-38, Supplemental Descriptions for Data Block CC (Lines 28, 29 and 33-41)

Number of Entries: A single entry per line.

Line	Description
28	The effect of varying this value is unknown. Use of the example value is recommended.
29	This value is fixed.
33	There can be no more than six currently.
34,35, 36,37	These should be set at the example values.
38	The units are named and enumerated in data block AA.
39,40	These should be set at the example values.
41	This factor prevents unrealistic grouping of artillery missions.

	LINE NUMBER	TACTICAL INPUT CONSTANTS	
[ICPYLM]	28	THE MAXIMUM NUMBER OF COMMIT AND DECOMMIT MESSAGES THAT MAY BE PENDING AT ANY ONE TIME.	☐☐☐☐☐☐☐☐
[ICUNLM]	29	THIS IS THE MAXIMUM NUMBER OF UNITS WITH WHICH ONE UNIT COULD INTERACT WITHIN ANY FIVE MINUTE PERIOD. IT IS ONE DIMENSION OF THE CONTACT LIST.	☐☐☐☐☐☐☐☐
[IDFCLM]	33	TOTAL NUMBER OF DS ARTILLERY BATTALIONS (FDCs), BOTH BLUE AND RED.	☐☐☐☐☐☐☐☐
[IDHLLM]	34	THE MAXIMUM NUMBER OF REQUESTS FOR FIRE WHICH MAY BE ON THE "HELP LIST" OF DIVISION ARTILLERY AT ANY ONE TIME.	☐☐☐☐☐☐☐☐
[IDMGLM]	35	THE MAXIMUM NUMBER OF ARTILLERY DAMAGE ASSESSMENT LIST ENTRIES. THAT IS, THE NUMBER OF UNITS ON WHICH ARTILLERY DAMAGE CAN BE ASSESSED AT ANY ONE TIME.	☐☐☐☐☐☐☐☐
[IFMSLM]	36	THE MAXIMUM NUMBER OF FIRE MISSIONS ANY DIRECT SUPPORT FDC MAY CONDUCT SIMULTANE-OUSLY.	☐☐☐☐☐☐☐☐
[IGHLLM]	37	THE MAXIMUM NUMBER OF REQUESTS FOR FIRE WHICH MAY BE ON THE "HELP LIST" OF A GENERAL SUPPORT ARTILLERY BATTALION AT ANY ONE TIME.	☐☐☐☐☐☐☐☐
[IRDSTR]	38	THE UNIT NUMBER OF THE FIRST RED UNIT IN THE EXERCISE. BLUE UNITS ARE NUMBERED FIRST AND THEN RED UNITS.	☐☐☐☐☐☐☐☐
[IRTELM]	39	THE SUM OF ALL TURNING POINTS ON ALL ROUTES IN THE PROBLEM.	☐☐☐☐☐☐☐☐
[KTARGP]	40	PRIORITY GIVEN ALL GS ARTILLERY TARGETS OF OPPORTUNITY MISSIONS.	☐☐☐☐☐☐☐☐
[LSTHLP]	41	MINIMUM TIME IN MINUTES SINCE THE LAST TIME AN ARTILLERY TARGET WAS FIRED ON BEFORE A MISSION REQUESTED BY A SUPPORTED GROUP MAY BE STARTED AGAINST THAT SAME TARGET.	☐☐☐☐☐☐☐☐

TABLE IV-39, Supplemental Descriptions for Data Block CC
(Lines 3-5, 42-45 and 48)

Number of Entries: A single entry per line, except for lines 3, 4 and 5 which have two entries; one for attacker and one for defender.

Line	Description
42	This factor prevents unrealistic grouping of artillery missions.
4	This value must be that of the example.
3	This value is used along with inputs from data block EG in the simulation of long range intelligence.
5	Attrition is inversely proportional to this value. The value is also a multiplier of fire effectiveness.
43	This value should not exceed the range of the detection device or some elements in contact may not be recognized as such.
44	The given move rate (in km/minute) is used to project group or pattern travel during a 15-minute period. The projected locations at the end of the period are used to determine if contact is expected.
45	Intelligence reports from long range surveillance units to own headquarters correspond to DLINE indexes of 25 and 26 in data block NA.
48	Each minute a unit's coordination level, C, is updated to C+ (line 48) x 1 - C.

Line 43, 44 and 49 - Groups or patterns are tested for contact only if they are less than 4 km apart. A pair of groups or patterns is in contact if the respective radii are separated by less than 2 x 15 x line 44 + line 43 = 2 x 15 x .2 + 4 = 10 km. If a group/pattern pair are found in contact, the component units are tested for contact. A pair of units is in contact if the radii are separated by less than 2 x 5 x line 44 + line 49 = 10 x .2 + 5.5 = 7.5 km.

TACTICAL INPUT CONSTANTS

	LINE NUMBER		
[LSTNON]	42	MINIMUM TIME IN MINUTES SINCE THE LAST TIME AN ARTILLERY TARGET WAS FIRED AT BEFORE A TARGET OF OPPORTUNITY MISSION MAY BE STARTED AGAINST THAT SAME TARGET.	
[MODEFF(1)] [MODEFF(2)]	4	UNIT EFFECTIVENESS MODE FOR ATTACKER (1) AND FOR DEFENDER (2).	
[MXRANG(1)] [MXRANG(2)]	3	SURVEILLANCE UNIT DISTANCE FOR BLUE (1) AND RED (2).	
[POSEFF(1)] [POSEFF(2)]	5	POSITION EFFECTIVENESS FOR ATTACKER (1) AND DEFENDER (2). THESE FACTORS ARE USED BY THOSE PROGRAMS WHICH USE FORCE RATIOS FOR ATTRITION RATES, FIRE SPLITTING, ETC.	
[PTCRNG]	43	THE MAXIMUM DISTANCE, IN KM, THAT A GROUP OR PATTERN MUST BE FROM AN ENEMY GROUP OR PATTERN BEFORE ANY INTERACTION MAY BE CONSIDERED BETWEEN THEM. THIS MEANS THAT IF THE DISTANCE IS GREATER THE COMPUTER DOES NOT NEED TO GO THROUGH ALL THE CALCULATIONS CONCERNED WITH CONTACT.	
[RATEMX]	44	A MOVEMENT RATE FOR PATTERNS, GROUPS, AND UNITS. THE COMPUTER USES THIS FACTOR TO LOOK AHEAD TO SEE IF CONTACT IS EXPECTED ON OR BEFORE THE NEXT CYCLE PERIOD SO THAT CONSIDERATION IS GIVEN TO INTERACTION ONLY WHEN NEEDED.	
[SURLMN]	45	LONG RANGE SURVEILLANCE CONSTANT. AN INTELLIGENCE CUTOFF VALUE. A SURVEILLANCE UNIT SENDS AN INTELLIGENCE MESSAGE TO ITS ASSOCIATED HEADQUARTERS ONLY IF THE INTELLIGENCE IT HAS PICKED UP ON AT LEASTONE ENEMY UNIT EXCEEDS SURLMIN. WHEN THE MESSAGE GETS THROUGH, ALL INTELLIGENCE ON ALL THE ENEMY UNITS ARE TRANSMITTED TO THE HEADQUARTERS.	
[TFADE]	48	FACTOR USED TO DEGRADE UNCOORDINATING FRONT LINE UNITS. EACH PAIR OF UNITS IN THE UNIT COORDINATION LIST HAS A COORDINATION NUMBER ASSOCIATED WITH IT. THIS NUMBER LIES BETWEEN 0 AND 1 WITH THE 0 REPRESENTING PERFECT COORDINATION.	

DATA BLOCK CC

TIN009-F

AD-A031 614 EVALUATION TECHNOLOGIES INC ARLINGTON VA F/G 17/2

COMMEL II USER'S MANUAL. VOLUME II. INPUT DATA PREPARATION.(U)

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2 OF 4

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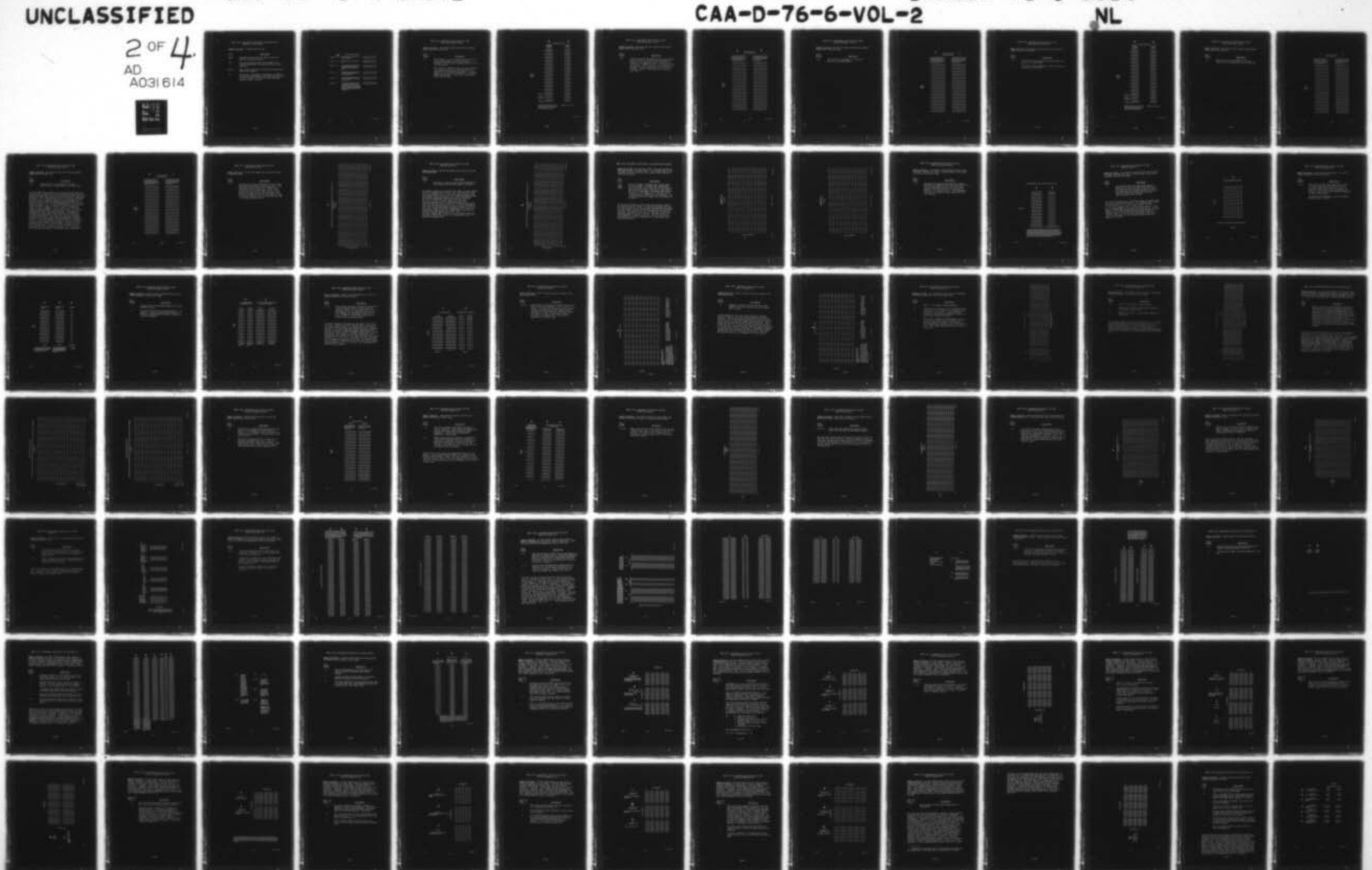

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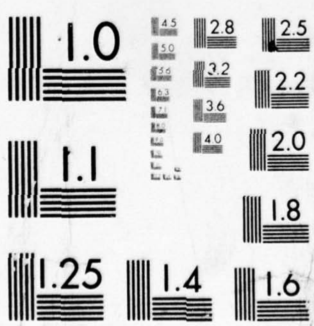


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

TABLE IV-40, Supplemental Descriptions for Data Block CC
(Lines 46, 47 and 49-52)

Number of Entries: A single entry per item.

Line	Description
47,46	Increasing these values will tend to reduce the number of artillery missions.
49	This value should be equal to the range of the longest range direct fire weapon (as input in data block FB).
50,51	These values should not be drastically changed from those of the example.
52	This factor is apparently applicable to all general support artillery missions. The factor does not apply to direct support fire missions, that are always assumed to have an observer.

	LINE NUMBER	TACTICAL INPUT CONSTANTS	
[TRGWTD]	47	MINIMUM TARGET WEIGHT FOR GS ARTILLERY TARGET OF OPPORTUNITY.	☐☐☐☐☐☐☐☐
[TRGWTG]	46	MINIMUM TARGET WEIGHT FOR GS ARTILLERY FIRE.	☐☐☐☐☐☐☐☐
[UNCRNG]	49	THE MAXIMUM DISTANCE THAT A UNIT MUST BE FROM AN ENEMY UNIT BEFORE ANY INTERACTION BETWEEN THE TWO UNITS CAN BE CONSIDERED.	☐☐☐☐☐☐☐☐
[UDLYHI]	50	NUMBER OF MINUTES DELAY BEFORE A UNIT IN LEAPFROG MODE CAN MOVE WHEN THE ADTC IS GREATER THAN ADTCUT.	☐☐☐☐☐☐☐☐
[UDLYHO]	51	THE NUMBER OF MINUTES DELAY BEFORE A UNIT IN LEAPFROG MODE CAN MOVE WHEN THE ADTC IS LESS THAN ADTCUT.	☐☐☐☐☐☐☐☐
[UNOBFR]	52	A FACTOR USED TO REDUCE THE INTELLIGENCE LEVEL ON A TARGET OF UNOBSERVED FIRE. IT IS A NUMBER BETWEEN 0 AND 1. THE TRUE INTELLIGENCE LEVEL IS MULTIPLIED BY UNOBFIRE AND THE RESULT IS USED BY THE DAMAGE ASSESSMENT PROGRAM TO DETERMINE ATTRITION ON THE UNOBSERVED TARGET.	☐☐☐☐☐☐☐☐

TABLE IV-41, Supplemental Descriptions for Data Block DA (Columns A and B)

Number of Entries: One entry for each column and each weapon/object type in the Blue force.

Entry Column	Description
A	These numbers are used as multiplicative factors in the artillery damage assessment to convert personnel attrition rates to weapon/object attrition for Blue weapons.
B	This value is a detection criterion that determines how susceptible a piece of Blue equipment is to acquisition by surveillance equipment. The value depends on the bulk and silhouette which a weapon/object type presents. Large values correspond to highly visible items.

STRENGTH MODIFIERS

BLUE WEAPON TYPE [I]		**A** ARTILLERY ARTRITION MULTIPLIER (PHI)	**B** DETECTION VALUE [DETECT]
	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
HIGH VISIBILITY	13		
MEDIUM VISIBILITY	14		
LOW VISIBILITY	15		

MOST VULNERABLE ITEMS HAVE VALUE OF 1.000 THEREBY SUFFERING FULL DAMAGE. THOSE ITEMS LESS VULNERABLE TO ARTILLERY FIRE RECEIVE A VALUE OF LESS THAN 1.000.

COMBAT INTELLIGENCE VALUE

TIN010-A

DATA BLOCK DA

TABLE IV-42, Supplemental Descriptions for Data Block DA (Columns C and D)

Number of Entries: One entry for each column and each weapon/object type in the Blue force.

Entry Column	Description
C,D	Entry C represents the maximum range of surveillance capability for the specified Blue equipment type. Entry D is the range within which 100 percent probability of detection occurs. These two entries are used in a linear formula to give probability of detection for each weapon/object as a function of distance. Entries C and D apply only to surveillance type 1.

C   D

STRENGTH MODIFIERS
SURVEILLANCE TYPE I

(1) A UNIT PICKS UP NO INTELLIGENCE ON ANOTHER UNIT WHEN THE DISTANCE BETWEEN THE UNITS IS GREATER THAN THE MAXIMUM RANGE OF THE SURVEILLANCE EQUIPMENT (DMAX).

(2) A UNIT KNOWS EVERYTHING ABOUT THE WEAPONS STRENGTH OF ANOTHER UNIT WHEN THE DISTANCE BETWEEN THE UNITS IS LESS THAN THE EFFECTIVE RANGE (DMIN).

BLUE WEAPON TYPE (I)

	C (1)	D (2)
1	.	.
2	.	.
3	.	.
4	.	.
5	.	.
6	.	.
7	.	.
8	.	.
9	.	.
10	.	.
11	.	.
12	.	.
13	.	.
14	.	.
15	.	.

TABLE IV-43, Supplemental Descriptions for Data Block DA (Columns E and F)

Number of Entries: One entry for each column and each weapon/object type in the Blue force.

Entry Column	Description
E,F	These entries are analogous to C and D but apply to surveillance device 2.

E

STRENGTH MODIFIERS
SURVEILLANCE TYPE 2

F

(1) A UNIT PICKS UP NO INTELLIGENCE ON ANOTHER UNIT WHEN THE DISTANCE BETWEEN THE UNITS IS GREATER THAN THE MAXIMUM RANGE OF THE SURVEILLANCE EQUIPMENT (DMAX).

(2) A UNIT KNOWS EVERYTHING ABOUT THE WEAPONS STRENGTH OF ANOTHER UNIT WHEN THE DISTANCE BETWEEN THE UNITS IS LESS THAN THE EFFECTIVE RANGE (DMIN).

BLUE WEAPON TYPE (I)	(1)	(2)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

TABLE IV-44, Supplemental Descriptions for Data Block DA (Columns G and H)

Number of Entries: One entry for each column and each weapon/object type in the Red force.

Entry Column	Description
G	This input is the counterpart of entry column A for weapons in the Red force.
H	This input is the counterpart of entry column B for weapons in the Red force.

STRENGTH MODIFIERS

RED WEAPON TYPE [I]	G ARTILLERY ARTRITION MULTIPLIER [PHI]	H DETECTION VALUE [DETECT]
1	.	
2	.	
3	.	
4	.	
5	.	.
6	.	
7	.	
8	.	
9	.	
10	.	
11	.	
12	.	
HIGH VISIBILITY 13	.	
MEDIUM VISIBILITY 14	.	
LOW VISIBILITY 15	.	

MOST VULNERABLE ITEMS HAVE VALUE OF 1.000 THEREBY SUFFERING FULL DAMAGE. THOSE ITEMS LESS VULNERABLE TO ARTILLERY FIRE RECEIVE A VALUE OF LESS THAN 1.000.

COMBAT INTELLIGENCE VALUE

TIN010-D

DATA BLOCK DA

TABLE IV-45, Supplemental Descriptions for Data Block DA (Columns I and J)

Number of Entries: One entry for each column and each weapon/object type in the Red force.

Entry Column	Description
I,J	These inputs are the counterparts of entry columns C and D, respectively, for the Red force.

I J

STRENGTH MODIFIERS
SURVEILLANCE TYPE I

RED WEAPON TYPE (I)	(1) A UNIT PICKS UP NO INTELLIGENCE ON ANOTHER UNIT WHEN THE DISTANCE BETWEEN THE UNITS IS GREATER THAN THE MAXIMUM RANGE OF THE SURVEILLANCE EQUIPMENT (DMAX).	(2) A UNIT KNOWS EVERYTHING ABOUT THE WEAPONS STRENGTH OF ANOTHER UNIT WHEN THE DISTANCE BETWEEN THE UNITS IS LESS THAN THE EFFECTIVE RANGE (DMIN).
1	.	.
2	.	.
3	.	.
4	.	.
5	.	.
6	.	.
7	.	.
8	.	.
9	.	.
10	.	.
11	.	.
12	.	.
13	.	.
14	.	.
15	.	.

TABLE IV-46, Supplemental Descriptions for Data Block DA (Column K and L)

Number of Entries: One entry for each column and each weapon/ object type in the Red force.

Entry Column	Description
K,L	These inputs are the counterparts of entry columns E and F, respectively, for the Red force.

The Blue M-60A1 tank and LAW incur attrition from artillery at 10 percent of the personnel rate. At the opposite extreme, the Blue machine gune and rifle are attrited by artillery at the same rate as personnel. (This interpretation follows from column A referenced by Table IV-2.) In terms of detectability, the M-60A1, the Blue LAW and Blue high visibility objects are most susceptible to detection (value = 15) while the DRAGON and Blue rifle are least susceptible (value = 2). A Red surveillance device of type 1 can detect an M-60A1, a LAW, or a Blue high visibility object at ranges to 5 km. A DRAGON, a 4.2 in. mortar, or a Blue rifle cannot be detected beyond .1 km by a type 1 device. There are no entries for type 2 intelligence devices. With respect to the Red force, using column G and Table IV-3, note that the T-62 and T-72 tanks attrit (due to artillery) at 10 percent of the personnel rate. These tanks also are readily detected (column H = 15) by Blue type 1 surveillance devices at ranges to 5 km. At the other extreme for Red, the SPG-7 is attrited by artillery at the personnel rate (column G = 1.0) and is barely visible (column H = 2) to a Blue surveillance device of type 1. The latter can detect a T-62 or T-72 tank at ranges to 5 km while the SPG-7 is not detectible beyond .1 km. As in the Blue force, Red does not possess a surveillance type 2 capability.

K L

STRENGTH MODIFIERS
SURVEILLANCE TYPE 2

RED WEAPON TYPE [I]

RED WEAPON TYPE [I]	(1) A UNIT PICKS UP NO INTELLIGENCE ON ANOTHER UNIT WHEN THE DISTANCE BETWEEN THE UNITS IS GREATER *THAN THE MAXIMUM RANGE OF THE SURVEILLANCE EQUIPMENT* [DMAX].	(2) A UNIT KNOWS EVERYTHING ABOUT THE WEAPONS STRENGTH OF ANOTHER UNIT WHEN THE DISTANCE BETWEEN *THE UNITS IS LESS THAN THE EFFECTIVE RANGE* [DMIN].
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

TABLE IV-47, Supplemental Descriptions for Data Block EA (Column A)

Number of Entries: One for each weapon type in each unit type in the Blue force.

Entry Column	Description
A	Indicates the relative desirability of firing each Blue weapon type against each Red unit type. These numbers are used to place fire on targets most vulnerable to firing weapon type. These values are relative only to each other, that is, if all entries were multiplied by the same number, there would be no change in the result of using this list. A high value indicates that the specified unit type is a highly desirable target.

A

MEASURE OF RELATIVE DESIRABILITY OF FIRING WEAPON TYPE ON ATTACKER UNIT TYPE

(MODE CODE = 1)

UNIT TYPE

[I]

WEAPON TYPE (BLUE)	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										

TIN011-A

[FYRFAC-LEFT HALF]

DATA BLOCK EA

TABLE IV-48, Supplemental Descriptions for Data Block EA (Column B)

Number of Entries: One for each weapon type in each unit type in the Blue force.

Entry Column	Description
B	Anal gous to column A except that the desirability of Red weapons against Blue targets is measured.

For example purposes only, data for unit types 1, 6 and 9 (towed artillery, command posts and tank units - see Table IV-1) are given. Using Table IV-2 as a key, note that Blue tanks, M-551, TOW, DRAGON, LAW and 81mm mortar are of lowest desirability for application against Red command posts, but are of maximum desirability (1000) when used against Red tank units.

The 4.2 in. mortar, M-113 APC, machine gun and rifle are of maximum desirability against Red command posts, but are minimally desirable against tank units. A similar interpretation holds for the Red weapons used against Blue units with the Red AT gun, 120 mm mortar, BMP, machine gun, SPG-7 and rifle rated highly (1000) against Blue command posts but, except for the BMP, low rated against tank units. The Red tanks, SAGGER, RPG-7, BRDM, and rocket launcher are rated desirable against Blue tank units, but unsuitable (rating = 1) against Blue command posts.

B

MEASURE OF RELATIVE DESIRABILITY OF FIRING WEAPON TYPE ON DEFENDER UNIT TYPE

(MODE CODE = 2)

UNIT TYPE
[I]

WEAPON TYPE (RED)	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										

TIN011-B

[FYRFAC-LEFT HALF]

DATA BLOCK EA

TABLE IV-49, Supplemental Descriptions for Data Block EB (Example)

Number of Entries: For each force there are as many entries per unit type as there are weapon types. At a maximum, there can be 12 weapon entries for each of 10 unit types on each side for a total of 240 entries.

Entry Line	Description
1-12 (both forms)	Each line denotes one weapon type. Object types are not included. The weapon type designations must agree with that of block AB. For each weapon type in each unit type in each force, this entry is the ratio of that weapon's firepower effectiveness to that of a rifle (which is 1). As such, it is called the basic 'combat value' of the weapon. For a fuller discussion of combat value, see Chapter II, section 5.

For the sake of brevity, only the first two rows and columns of the example forms are filled in. Referring to Tables IV-2 and IV-3, we see that for the Blue attacker the M-60A1 and the M-60A3 tank have combat values of 12 and 15 respectively for each Blue unit type. For the Red force, the T-62 and the T-72 tank have respective combat values of 17 and 23. The combat value of a rifle/handweapon is one for each force. Only 11 rows of Blue force entries are filled in because only 11 weapon types were defined (Table IV-2).

WEAPON VALUE
(COMPARED TO RIFLE=001)

UNIT TYPE
[I]

WEAPON TYPE (BLUE)	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										

TIN012-A   ADJUST - RIGHT HALF   DATA BLOCK EB

WEAPON VALUE
(COMPARED TO RIFLE=001)

UNIT TYPE
[I]

WEAPON TYPE (RED)	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										

TIN012-B

ADJUST - RIGHT HALF

DATA BLOCK EB

TABLE IV-50, Supplemental Descriptions for Data Block EC (Columns A and B)

Number of Entries: For columns A and B enter one value for each unit type. For each unit type in column C enter as many values as there are GS artillery types.

Entry Column	Description
A, B	The entries of these columns are used to compute a multiplier that modifies artillery target value. If D is the distance between a target unit and a forward observer, then the multiplier is the larger of column B - (D x column A) and 1. This methodology will tend to increase artillery target value for close targets.

DISTANCE WEIGHT FOR ARTILLERY SELECTION FOR TARGET

UNIT TYPE [I]	A LINEAR COEFFICIENT	B CONSTANT TERM
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
	[ARTDST–LEFT HALF–SCALE 3]	[ARTDST–RIGHT HALF–SCALE 2]

THIS LIST CONTAINS PARAMETERS USED BY THE ARTILLERY TARGET SELECTION PROGRAM TO MODIFY THE WEIGHT OF AN ENEMY UNIT ON THE BASIS OF DISTANCE BETWEEN THE ENEMY UNIT AND THE FORWARD OBSERVER'S UNIT, OR FROM THE GROUP CENTER. THIS DISTANCE IS FOUND, AND BASED ON ENEMY UNIT TYPE, IS MULTIPLIED BY THE FIRST ENTRY, AND THE PRODUCT IS SUBTRACTED FROM THE SECOND ENTRY. IF THE RESULT IS GREATER THAN 1, IT IS MULTIPLIED BY THE PRE-CALCULATED TARGET WEIGHT TO GET THE FINAL TARGET WEIGHT. IF LESS THAN 1, TARGET WEIGHT IS NOT CHANGED.

TABLE IV-51, Supplemental Descriptions for Data Block EC (Column C)

Number of Entries: For columns A and B enter one value for each unit type. For each unit type in column C enter as many values as there are GS artillery types.

Entry Column	Description
C	The various GS artillery types (see column E, block BA) are rated according to the desirability of firing that artillery against each unit type. The higher the value entered here for an artillery type, the greater the suitability of its use against the specified unit type.

The value of command posts as artillery targets is enhanced when they are 2 km or less from the FO. This interpretation is based on the fact that D = 2 is the largest distance for which 2 - (.5 x D) is greater than 1. The artillery value of a tank unit is enhanced when it is within 5 km of the FO, (2 - [.2 x 5] equals 1). Analyzing the GS artillery weights (column C), note that GS type 1 is first ranked when unit types 3 or 8 are targets. Type 2 is first priority against unit types 4, 5, 7 and 9 while GS type 3 is most preferred against target unit types 1, 2, 6 and 10.

C

GENERAL SUPPORT BATTALION TYPE
[J]

UNIT TYPE
[I]

	1	2	3	4	5	6
1	☐	☐	☐	☐	☐	☐
2	☐	☐	☐	☐	☐	☐
3	☐	☐	☐	☐	☐	☐
4	☐	☐	☐	☐	☐	☐
5	☐	☐	☐	☐	☐	☐
6	☐	☐	☐	☐	☐	☐
7	☐	☐	☐	☐	☐	☐
8	☐	☐	☐	☐	☐	☐
9	☐	☐	☐	☐	☐	☐
10	☐	☐	☐	☐	☐	☐

WEIGHT OF UNIT TYPE AS TARGET FOR GENERAL SUPPORT BATTALION TYPE.

[TRGTWT]

TABLE IV-52, Supplemental Descriptions for Data Block ED (Columns A-C)

Number of Entries: Enter one value (column A-C) or a pair of values (column D-G) for each unit type.

Entry Column	Description
A, B	These values are the lethal areas (m^2) of 105mm equivalent rounds for exposed and protected personnel respectively in each unit type. The value for column B should be less than that for column A. The range of values should be comparable to those displayed here.
C	The vehicle/foot designator is used to determine movement rates in block FC.

	A	B	C
	[ARDFAC(I,1,3) SCALE 3]	[ARDFAC(I,2,3) SCALE 3]	[MUVMOD]
UNIT TYPE [I] 1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
	EXPOSED	PROTECTED	MOVEMENT MODE
	THE LETHAL AREA EXPOSED IS THE LETHAL AREA IN SQUARE METERS, OF 105 MM EQUIVALENT ROUND FOR AVERAGE EXPOSED PERSONNEL IN EACH UNIT TYPE.	THE LETHAL AREA PROTECTED IS THE LETHAL AREA IN SQUARE METERS OF 105 MM EQUIVALENT ROUND FOR AVERAGE PROTECTED PERSONNEL IN EACH UNIT TYPE.	0 = BY VEHICLE, 1 = BY FOOT.

TABLE IV-53, Supplemental Descriptions for Data Block ED (Columns D and E)

Number of Entries: Enter one value (column A-C) or a pair of values (column D-G) for each unit type.

Entry Column	Description
D	Average fraction of personnel exposed to artillery in each unit type.
E	This value should be in the range displayed in the example. A large value entered here implies a dispersed target and hence a lesser vulnerability to artillery damage.

UNIT TYPE [I]	D AVERAGE PROPORTION OF PERSONNEL EXPOSED		E UNIT AREA IN SQUARE METERS DIVIDED BY UNIT TOTAL STRENGTH	
	ATTACKER	DEFENDER	ATTACKER	DEFENDER
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
	ARDFAC(I,1,2) LEFT HALF SCALE 3	ARDFAC(i,2,2) LEFT HALF SCALE 3	ARDFAC(I,1,2) RIGHT HALF	ARDFAC(I,2,2) RIGHT HALF

TABLE IV-54, Supplemental Descriptions for Data Block ED (Columns F and G)

Number of Entries: Enter one value (column A-C) or a pair of values (column D-G) for each unit type.

Entry Column	Description
F, G	These values are used to calculate the fraction of a unit's firepower which is suppressed by an artillery strike. If (fraction) D of a unit is attritted by a strike, then the fraction of the unit firepower not suppressed by the strike is 1/ (1 + column F x D) and this suppression is effective for the period G (min).

For example purposes, only data for unit types 1, 6 and 9 are filled in. Lethal areas shown range from 354.2 square meters for exposed command posts to 28.4 square meters for protected tank units. All unit types depicted are motorized. Regarding exposure, 50 percent of attacker command post personnel are exposed, but only 25 percent of defender command post personnel are exposed. With respect to artillery suppression, if an attacker tank unit suffers .01 attrition in an artillery strike, then only 1/ (1 + .01 x 15) = .87 of the tank unit's firepower will be effective for the next 15 minutes. For defender tank units suffering .01 attrition from a strike, the unit firepower unsuppressed will be 1/ (1 + .01 x 10) = .91 and suppression will last only 5 minutes.

	F		G	
	CEF SCALING CONSTANT		TIME INCREMENT CEF APPLICABLE	
UNIT TYPE [I]	ATTACKER	DEFENDER	ATTACKER	DEFENDER
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
	I,1,1	I,2,1	I,1	I,2
	[ARDFAC]		[SUPTYM]	

TABLE IV-55, Supplemental Descriptions for Data Block EE (Column A)

Number of Entries: Enter 13 values for each unit type in the Blue attacker force.

Entry Column	Description
A (1-13)	Column number N represents an interval of cumulative Blue unit attrition between 5 x (N - 1) and 5 x N percent. For each such interval enter the fraction of Blue unit fighting capability remaining when cumulative unit attrition lies within the interval. This factor is used to reduce Blue firepower delivered in accordance with a unit's loss of capability as a fighting unit.

A

CUMULATIVE ATTRITION
[J]

UNIT TYPE [I]

	1	2	3	4	5	6	7	8	9	10	11	12	13
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

THERE IS ONE ROW OF DATA ON THIS SHEET FOR EACH UNIT TYPE IN THE PROBLEM.

THERE ARE TWO UNIT EFFECTIVENESS MODES (ONE FOR ATTACK (MODE = 1) AND ONE FOR DEFENSE (MODE = 2)). A UNIT'S EFFECTIVENESS MODE IS ASSIGNED BASED ON THE UNIT MODE. THE PERCENTAGE INTERVALS STAND FOR THE CUMULATIVE ATTRITION A UNIT HAS SUFFERED SINCE THE START OF PLAY.

A VALUE, RANGING FROM 1, FOR COMPLETELY EFFECTIVE, TO 0 FOR TOTALLY INEFFECTIVE IS ENTERED FOR ALL PERCENTAGE INTERVALS DESIRED FOR THIS PROBLEM.

THIS VALUE REPRESENTS HOW EFFECTIVE A UNIT (BY UNIT TYPE-EFFECTIVENESS MODE) WILL BE AFTER SUFFERING A GIVEN AMOUNT OF CUMULATIVE ATTRITION.

TINC15-A EFFECT (I, J) LEFT HALF ATTACKER (MODE = 1) DATA BLOCK EE

TABLE IV-56, Supplemental Description for Data Block EE (Column B)

Number of Entries: Enter 13 values for each unit type in the Red defender force.

Entry Column	Description
B	Analogous to column A, except that this value applies to Red unit types and is used to reduce Red firepower.

A Blue command post unit (type 6) has no loss in fighting capability until it suffers at least 15 percent (cumulative) attrition. The CP unit fighting capability is only 90 percent effective for unit attrition between 15 and 20 percent, only 80 percent effective between 20 and 25 percent attrition. Above 40 percent attrition, a Blue CP has zero capability remaining. A Blue tank unit, on the other hand, loses no fighting capability up to 20 percent attrition, above which it gradually is reduced in capability with increasing attrition until no effectiveness remains after more than 60 percent of the unit is attritted. The data for Red units is interpreted in a similar manner.

B

CUMULATIVE ATTRITION
[J]

UNIT TYPE [I]

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	.	.	.	.	.	.	.	.	.	.	.	.	.
2	.	.	.	.	.	.	.	.	.	.	.	.	.
3	.	.	.	.	.	.	.	.	.	.	.	.	.
4	.	.	.	.	.	.	.	.	.	.	.	.	.
5	.	.	.	.	.	.	.	.	.	.	.	.	.
6	.	.	.	.	.	.	.	.	.	.	.	.	.
7	.	.	.	.	.	.	.	.	.	.	.	.	.
8	.	.	.	.	.	.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.	.	.	.	.	.
10	.	.	.	.	.	.	.	.	.	.	.	.	.

THERE IS ONE ROW OF DATA ON THIS SHEET FOR EACH UNIT TYPE IN THE PROBLEM.

THERE ARE TWO UNIT EFFECTIVENESS MODES (ONE FOR ATTACK (MODE = 1) AND ONE FOR DEFENSE (MODE = 2)). A UNIT'S EFFECTIVENESS MODE IS ASSIGNED BASED ON THE UNIT MODE. THE PERCENTAGE INTERVALS STAND FOR THE CUMULATIVE ATTRITION A UNIT HAS SUFFERED SINCE THE START OF PLAY.

A VALUE, RANGING FROM 1, FOR COMPLETELY EFFECTIVE, TO 0 FOR TOTALLY INEFFECTIVE IS ENTERED FOR ALL PERCENTAGE INTERVALS DESIRED FOR THIS PROBLEM.

THIS VALUE REPRESENTS HOW EFFECTIVE A UNIT (BY UNIT TYPE-EFFECTIVENESS MODE) WILL BE AFTER SUFFERING A GIVEN AMOUNT OF CUMULATIVE ATTRITION.

TIN015-B EFFECT (I, J) RIGHT HALF DEFENDER (MODE = 2) DATA BLOCK EE

TABLE IV-57, Supplemental Descriptions for Data Block EG (Columns A-C)

Number of Entries: For columns A and B and for all subcolumns of column C, enter one value for each unit type.

Entry Column	Description
A	Enter '1' for attacker mode designation.
B	This value is a parameter in an intelligence determination formula. As such, it is separated from a 'real world' significance in terms of Red unit strength. Intelligence is sensitive to values in this column and those of column C.
C	These values represent the intelligence picked up by a Blue long range surveillance device of the specified type in 15 minutes of flat terrain at 1 km distance from a defender unit of the specified type. This column cross-references with column D of block LB.

LONG RANGE SURVEILLANCE FACTORS FOR ATTACKER (MODE = 1)

A	B	C						
UNIT TYPE (J)	STRENGTH	SURVEILLANCE DEVICE TYPES						
		1	2	3	4	5	6	7
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

NORMAL STRENGTH FOR A UNIT OF MODE I AND UNIT TYPE J.

INTELLIGENCE INCREMENT FOR MODE I, UNIT TYPE J, AND SURVEILLANCE DEVICE TYPE K. TOTAL NUMBER OF PERSONNEL THAT MILITARY JUDGMENT FEELS CAN BE DETECTED AT ONE KM IN "IDEAL" TERRAIN.

TIN016-A

DATA BLOCK E6

TABLE IV-58, Supplemental Descriptions for Data Block EG (Columns D-F)

Number of Entries: For columns D and E and for all subcolumns of column F, enter one value for each unit type.

Entry Column	Description
D	Enter '2' for defender mode designation.
E	Analagous to column B, except that it applies to Blue attacker target units.
F	Analagous to column C, except that it applies to Red devices.

In the example shown, only three lines are filled in. The data indicate that a Red or Blue tank unit (type 9) is easier to detect than a CP (type 6). An artillery unit (type 1) is easier to detect than a tank unit. The larger values in columns B and C for mode 1 (attacker) indicate that Red defender units are less susceptible to detection than are Blue attacker units.

LONG RANGE SURVEILLANCE FACTORS FOR DEFENDER (MODE = 2)

D	E	F						
UNIT TYPE (J)	STRENGTH	SURVEILLANCE DEVICE TYPES						
		1	2	3	4	5	6	7
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

NORMAL STRENGTH FOR A UNIT OF MODE I AND UNIT TYPE J

INTELLIGENCE INCREMENT FOR MODE I, UNIT TYPE J, AND SURVEILLANCE DEVICE TYPE K. TOTAL NUMBER OF PERSONNEL THAT MILITARY JUDGMENT FEELS CAN BE DETECTED AT ONE KM IN "IDEAL" TERRAIN

T1N016-0

DATA BLOCK EG

TABLE IV-59, Supplemental Descriptions for Data Block EM

Number of Entries: For each force there are as many entries per unit type as there are weapon/object types. At a maximum, there can be 15 entries (12 weapon plus three object types) for each of 10 unit types on each side for a total of 300 total entries.

Entry Line	Description
1-15	Taken as a percent, these entries are used to convert personnel attrition to materiel attrition. Thus, if A is a computed personnel attrition rate, the product of this entry (divided by 100) and A is the attrition rate that the force/weapon/unit type combination represented by that entry. The purpose of this data block is to reflect the varying vulnerability of equipment according to the structure of the unit in which it is located. Lines 1-12 correspond to the weapon types of blocks EB and AB. Lines 13-15 correspond to the object classes of data block AB.

For brevity, only the first two rows and columns of the example are entered. Lines 1-12 correspond to entries in Table IV-2 and IV-3. Lines 13-15 are object types (block AB). In the example Blue uses only 11 weapon types, so the twelfth line of Blue form EM can be (and is) filled with meaningless entries. Referring to Table IV-1 (unit types), we see that materiel in artillery and mortar units (unit types 1, 2 and 3) attrit at 17 percent of the equipment attrition rate in units which are signal centers, command posts, infantry units or support units (units types 5, 6, 8 and 10). While it is possible to apply different attrition modifiers to Red and Blue weapon/object types, the example is limited to variation over unit type.

DIRECT FIRE ATTRITION MULTIPLIER

(AMOUNT BY WHICH TO MODIFY ATTRITION SUFFERED BY DIFFERENT WEAPON TYPES IN DIFFERENT UNIT TYPES AS A RESULT OF GROUND COMBAT)

UNIT TYPE [I]

WEAPON TYPE (BLUE) [J]	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
HIGH VISIBILITY 13										
MED VISIBILITY 14										
LOW VISIBILITY 15										

TIN017-A

ADJUST - LEFT HALF

DATA BLOCK EM

DIRECT FIRE ATTRITION MULTIPLIER

(AMOUNT BY WHICH TO MODIFY ATTRITION SUFFERED BY DIFFERENT WEAPON TYPES IN DIFFERENT UNIT TYPES AS A RESULT OF GROUND COMBAT)

WEAPON TYPE (RED) [J]	UNIT TYPE [I] 1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
HIGH VISIBILITY 13										
MED VISIBILITY 14										
LOW VISIBILITY 15										

TIN017-B

ADJUST - LEFT HALF

DATA BLOCK EM

TABLE IV-60, Supplemental Descriptions for Data Block FA (Columns A and B)

Number of Entries: There should be exactly 15 entries per column, one for each terrain class.

Entry Column	Description
A	This value is an average attrition fraction (rate over a 1 minute combat period) applicable to personnel. It represents a basic rate against an opposing and equal enemy. The combat day is taken to be 14 hours.
B	This entry is similar to entry A except that it applies to unopposed units only. As such, it represents noncombat losses due to disease, injury, natural causes, etc. These attrition values are used without modification for unopposed units.

A **B**

AVERAGE ATTRITION

TERRAIN CLASS [I]	OPPOSED ATTRITION FACTOR FOR UNIT FACING AN ENEMY OF EQUAL STRENGTH DURING A ONE MINUTE PERIOD	UNOPPOSED (DUE TO DISEASE, INJURY AND EQUIPMENT FAILURES IN ONE MINUTE PERIOD.)
1	.	.
2	.	.
3	.	.
4	.	.
5	.	.
6	.	.
7	.	.
8	.	.
9	.	.
10	.	.
11	.	.
12	.	.
13	.	.
14	.	.
15	.	.
	[AFTRIT-LEFT HALF-SCALE 6]	[ATTRIT-RIGHT HALF-SCALE 6]

TIN018-A

TABLE IV-61, Supplemental Descriptions for Data Block FA (Columns C-E)

Number of Entries: There should be exactly 15 entries per column, one for each terrain class.

Entry Column	Description
C	This factor degrades intelligence according to terrain conditions. Values should be between zero and one, with high values reflecting minimal degradation. Terrain class one represents essentially a flat surface.
D, E	These factors affect the amount of intelligence picked up by long range surveillance devices. As each of these quantities increases, intelligence decreases. The terrain class is that in the vicinity of the observing unit for column D and of the observed unit for column E.

Only five of the 15 classes are assigned entry values in the example. Basic opposed attrition rates for a combat day (840 minutes) vary from 840 x .00024 = .202 (20.2 percent) in terrain class one to 840 x .00012 = .101 (10.1 percent) in terrain class thirteen. Surveillance factors for the observing unit (column D) are not used.

TERRAIN CLASS [I]	C	D	E
	SURVEILLANCE DEGRADATION (DUE TO COVER AND OTHER CHARACTERISTICS AT THE LOCATION OF TARGET.)	FACTOR BY WHICH SURVEILLANCE IS AFFECTED FOR OBSERVING UNIT	FACTOR BY WHICH SURVEILLANCE IS AFFECTED FOR OBSERVED UNIT
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
	[SURDEG-SCALE 1]	[SESWTR-RIGHT HALF-SCALE 1]	[SESWTR-LEFT HALF-]

TIN018-B

DATA BLOCK FA

TABLE IV-62, Supplemental Description for Data Block FB (Column A)

Number of Entries: One value is entered for each weapon type in each of 15 terrain classes for the Blue attacker force.

Entry Column	Description
A (1-15)	These values are the nominal ranges of the specified attacker weapon types in the terrain at the firing location. The level of terrain resolution (see block RA) is the grid square, which is customarily one square kilometer.

A

WEAPON RANGE (IN KILOMETERS)
FOR ATTACKER
(MODE = 1)

TERRAIN CLASS
[I]

WEAPON TYPE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															

TING19-A

WEPRNG - LEFT HALF

DATA BLOCK FB

TABLE IV-63, Supplemental Description for Data Block FB (column B)

Number of Entries: One value is entered for each weapon type in each of 15 terrain classes for the Red force.

Entry Column	Description
B (1-15)	These values are analogous to those of entry A except that they apply to Red defender weapons.

Only the first row and column of the example forms are filled in. Over the first (and all) terrain classes, reference to Table IV-2 shows that attacker weapon ranges vary from .25 km for the DRAGON to 6 km for the machine gun. Using Table IV-3, the extremes in defender weapon ranges are from .3 km for the RPG-7 to 10 km for the machine gun.

B

WEAPON RANGE (IN KILOMETERS)
FOR DEFENDER
(MODE = 2)

TERRAIN CLASS
[I]

WEAPON TYPE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															

T1M019-B

WEPRNG - RIGHT HALF

DATA BLOCK FB

TABLE IV-64, Supplemental Description for Data Block FC (Column A)

Number of Entries: Enter one foot move rate for each group mode in each terrain class. The entire block should have 210 values.

Entry Column	Description
A	This value is the basic unopposed move rate in km/min for units on foot. Each subcolumn represents a group mode. Group modes designate types of movement and are summarized in Table IV-5. Each line of the block corresponds to one terrain class. The values entered here are modified by intelligence and force ratio in order to determine the final move rate of a group.

A

AVERAGE MAXIMUM MOVEMENT RATE ON FOOT FOR GROUP MODE

TERRAIN CLASS [I]	1	2	3	4	5	6	7
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

TIN020-A

[MVRATE RIGHT HALF-SCALE 3]

DATA BLOCK FC

TABLE IV-65, Supplemental Description for Data Block FC (Column B)

Number of Entries: Enter one vehicular move rate for each group mode in each terrain class.

Entry Column	Description
B	Analogous to A for groups moving in vehicular move modes. Whether a unit is in foot or vehicular move mode is determined by assignment of column C of block AA and column C of block ED.

Only five of the 15 example lines are used in the example. Static defense has a zero move rate. For foot units, the attack move rate varies from 2.6 km/hr in the most favorable terrain to .6 km/hr in terrain class 13. For vehicular units, the corresponding variation is from 10 km/hr to 1.5 km/hr. Mode (column) 5 entries are not used in the model. The highest move rate, 12.3 km/hr, is for vehicular units in defender groups with withdrawal or leapfrog mode.

B

AVERAGE MAXIMUM MOVEMENT RATE IN VEHICLES FOR
GROUP MODE

TERRAIN CLASS [I]	1	2	3	4	5	6	7
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

TIN020-B (MVRATE-LEFT HALF-SCALE 3) DATA BLOCK FC

TABLE IV-66, Supplemental Descriptions for Data Block HA

Number of Entries: For each column, there should be one value for each group move mode.

Entry Column	Description
A	This firepower modification factor is used in allocation of fires delivered. It is a multiplier of basic fire which is derived from the weapon combat values.
B-F	These values determine movement characteristics of units in leapfrogging groups. They should not be tampered with at this time.

Units in withdrawal or yield mode have only two thirds of basic fire. Units in leapfrog, attack or reserve mode, have full basic firepower. Units in static defense have firepower 50 percent in excess of the basic rate.

GROUP MODE. AT THE PRESENT TIME THERE ARE SEVEN GROUP MODES: WITHDRAWAL - 1; LEAPFROG - 2; RESERVE - 3; YIELD - 4; PATTERN - 5; STATIC DEFENSE - 6; ATTACK - 7.

GROUP MODE [I]	A	B	C	D	E	F
	– THE FIRE THAT A UNIT, IN A GIVEN GROUP MODE, DELIVERS IS MULTIPLIED BY THE GROUP *EFFECTIVENESS FACTOR. THAT* IS, THE AMOUNT OF FIRE DELIVERED BY A UNIT DEPENDS ON THE MODE THAT ITS GROUP IS IN AT THAT TIME.	MAXIMUM DESIRABLE DISTANCE (IN KM) BETWEEN A FRONT LINE UNIT AND THE POINT TOWARD WHICH IT MOVES (RABBIT).	THE MINIMUM DESIRABLE DISTANCE (IN KM) BETWEEN A FRONT LINE UNIT AND ITS RABBIT.	– *THE DISTANCE (IN KM) BETWEEN* THE CENTER OF A FRONT LINE GROUP AND THE POINT ON ITS ROUTE AT WHICH THE "RABBIT BAR" IS ERECTED.	A NUMBER BETWEEN 0 AND 1 WHICH IS MULTIPLIED BY THE PRE-CALCULATED MOVE RATE (DISTANCE PER MINUTE) OF A FRONT LINE UNIT WHICH IS TOO CLOSE TO ITS RABBIT.	A NUMBER GREATER THAN ONE WHICH IS MULTIPLIED BY THE PRE-CALCULATED MOVE RATE (DISTANCE PER MINUTE) OF A FRONT LINE UNIT WHICH IS TOO FAR FROM ITS RABBIT.
	[GRPEFF(I,1)]	[GRPEFF(I,2)]	[GRPEFF(I,3)]	[GRPEFF(I,4)]	[GRPEFF(I,5)-LEFT HALF]	[GRPEFF(I,5)-RIGHT HALF]
1						
2						
3						
4						
5						
6						
7						

TINO21

DATA BLOCK HA

TABLE IV-67, Supplemental Descriptions for Data Block JA (Columns A-D)

Number of Entries: For each column, enter as many values as there are headquarters pairs which exchange intelligence. There must be no more than 60 headquarters pairs in this block.

Entry Column	Description
A, B	A unit designated here must be a division CP, a brigade CP, a battalion CP, a direct support FDC, or a division artillery CP.
C	If the unit in column A has more intelligence about an enemy unit indicated in column C than has the entry in column B, then an adjustment message is sent between the two.
D	Analogous to column C except that it applies to column B intelligence surplus over that of column A.

A	B	C	D
THIS IS A LIST OF THE UNIT INDICES OF ALL THE HEADQUARTERS UNITS THAT ARE REQUIRED TO EXCHANGE INTELLIGENCE WITH EACH OTHER. ONLY THOSE ORGANIZATION PAIRS APPEARING IN THIS LIST WILL EXCHANGE INTELLIGENCE INFORMATION. TO APPEAR HERE, A UNIT MUST BE A DIVISION, BRIGADE, OR BATTALION CP, A DIRECT SUPPORT FDC, OR A DIVARTY FDC.		ASSOCIATED WITH THE UNIT NUMBERS IS THE INTELLIGENCE SURPLUS. THIS IS A NUMBER, LESS THAN 1, WHICH TELLS HOW MUCH MORE INTELLIGENCE THIS HQ MUST HAVE ABOUT A SINGLE ENEMY UNIT THAN THE OTHER HQ IN THE PAIR, BEFORE A MESSAGE IS SENT BETWEEN THEM.	

INTELLIGENCE COORDINATING PAIR NUMBER

	INPAIR(I,1) LEFT HALF	INPAIR(I,2) LEFT HALF	INPAIR(I,1) RIGHT HALF	INPAIR(I,2) RIGHT HALF
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

TIN022-A

DATA BLOCK JA

INTELLIGENCE COORDINATING PAIR NUMBER

	INPAIR(I,1) LEFT HALF	INPAIR(I,2) LEFT HALF	INPAIR(I,1) RIGHT HALF	INPAIR(I,2) RIGHT HALF
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				

TIN022-A(CONT'D)

DATA BLOCK JA

TABLE IV-68, Supplemental Descriptions for Data Block JA (Columns E-J)

Number of Entries: For each column, enter as many values as there are headquarters pairs which exchange intelligence. There must be no more than 60 headquarters pairs in this block.

Entry Column	Description
E-H	Codes are assigned according to the type headquarters indicated in columns A and B. The key for code assignments is given on the first form of the data block. Entries in columns E and G correspond to the unit of column A. Entries in columns F and H correspond to the unit of column B.
I, J	Column I gives the DLINE index (message type from block NA) for the adjustment messages sent from column A to column B. Column J gives the DLINE index for messages from column B to column A.

The first pair has a division CP (unit 1) and a div arty CP (unit 3). Therefore, column E has a '1' (for division CP) and column G has a '4' since there are three Blue brigades (see key on form TIN022-C). The codes for div arty CP dicate that columns F and H have '0' and '1' respectively. The associated DLINE index (message type code) is 15. The second pair shown has the division CP and the 1st brigade CP (unit 4). Therefore, columns E and G are the same as for the first pair. Column F has '1' and column H has '1', the latter indicating a 1st brigade CP. The associated message type is 15 again. The third pair has the 1st brigade CP and a DS FDC. Therefore, columns E and G are the same as columns F and H of the second pair. Column F has a '2' because unit 9 is a DS FDC. Reference to column C of form BA shows that unit 9 is the DS FDC of the first group. Therefore, entry H has a '1'. The associated message type code is 18.

THIS IS A LIST OF THE UNIT INDICES OF ALL THE HEADQUARTERS UNITS THAT ARE REQUIRED TO EXCHANGE INTELLIGENCE WITH EACH OTHER. ONLY THOSE ORGANIZATION PAIRS APPEARING IN THIS LIST WILL EXCHANGE INTELLIGENCE INFORMATION. TO APPEAR HERE, A UNIT MUST BE A DIVISION, BRIGADE, OR BATTALION CP, A DIRECT SUPPORT FDC, OR A DIVARTY FDC.

THE MESSAGE TYPE (DLINE INDEX) USED FOR INTELLIGENCE TRANSFER FROM FIRST ENTRY TO SECOND AND FROM SECOND ENTRY TO FIRST.

INTELLIGENCE COORDINATING PAIR NUMBER	E	F	G	H	I	J
	LOG		ROW		DLINE INDEX	
	[INPAR2(I,1,1)]	[INPAR2(I,2,1)]	[INPAR2 (I,1,2)]	[INPAR2 (I,2,2)]	[INPAR2(I,1,3)]	[INPAR2(I,2,3)]
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						

TIN022-B

DATA BLOCK JA

	LOG		ROW		DLINE INDEX	
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						

TIN022-B(CONT'D)

DATA BLOCK JA

	LOG		ROW		DLINE INDEX	
43						
44						
45						
46						
47						
48						
49						
50						
51						
52						
53						
54						
55						
56						
57						
58						
59						
60						

TIN022-B(CONT'D)

DATA BLOCK JA

LOG

0 IS DIVARTY (INTBDA OR INTRDA)

1 IF BRIGADE OR DIVISION CP (INTBBD OR INTRBD).

2 IF DIRECT SUPPORT FDC (INTBDS OR INTRDS)

3 IF GROUP CP (INTBGP OR INTRGP)

ROW

LOG 0 – ALWAYS 1

LOG 1 – BRIGADE CP –1 FOR THE FIRST RED OR BLUE BRIGADE CP, 2 FOR THE SECOND RED OR BLUE BRIGADE CP, ETC.

DIVISION CP – FOLLOWS LAST BRIGADE CP FOR ITS COLOR. i.e., IF THERE ARE THREE BLUE BRIGADES, THE BLUE DIVISION CP WOULD HAVE ITS LOG IN ROW 4.

LOG 2 – 2 FOR FIRST RED OR BLUE DIRECT SUPPORT FDC. 2 FOR SECOND RED OR BLUE DIRECT SUPPORT FDC, ETC.

LOG 3 – 1 FOR FIRST RED OR BLUE GROUP CP, 2 FOR SECOND RED OR BLUE GROUP CP, ETC.

TIN022-C

DATA BLOCK JA

TABLE IV-69, Supplemental Descriptions for Data Block KA

Number of Entries: Enter one value in each column for each coordinating pair of units. There must be no more than 40 pairs in this list.

Entry Column	Description
A, B	As units are committed and decommitted during play, the list of coordinating units may be modified according to inputs from data block PD. Coordinating units should be adjacent initially.

The units of group 1 (see example of block BA) form two coordinating pairs. A group with four units can form, at most, three coordinating pairs under the adjacency requirement.

THE UNIT COORDINATION LIST CONTAINS PAIRS OF UNITS THAT ARE REQUIRED TO COMMUNICATE FROM TIME TO TIME. ALL ADJACENT UNITS INITIALLY IN FRONT LINE GROUPS MUST BE ENTERED IN THIS LIST. A UNIT IS LISTED AS MANY TIMES AS THERE ARE ADJACENT UNITS WITHIN ITS GROUP. AS UNITS ARE COMMITTED AND DECOMMITTED DURING PLAY, THIS LIST WILL BE MODIFIED BY THE COMPUTER.

COORDINATING PAIR NUMBER

	A [COORD(I,1)-LEFT HALF]	B [COORD(I,1)-RIGHT HALF]
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

COORDINATING PAIR NUMBER

	A (Cont'D) [COORD(I,1)-LEFT HALF]	B (Cont'D) [COORD(I,1)-RIGHT HALF]
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		

TIN023

DATA BLOCK KA

TABLE IV-70, Supplemental Descriptions for Data Block LA

Number of Entries: Assign exactly one value to each entry.

Entry Column	Description
A	Assign (from the unit list of block AA) the unit number of the Blue attacker div arty CP.
B	Assign the unit number of the Red defender div arty CP.

A	B
BLUE	RED

UNIT NUMBER FOR LONG RANGE SURVEILLANCE UNIT FOR DIVISION ARTILLERY.

TABLE IV-71, Supplemental Descriptions for Data Block LB

Number of Entries: For each column, enter as many values as there are surveillance pairs. A surveillance pair consists of a unit with long range surveillance capability and the headquarters to which it reports. These must be no more than a combined (Red plus Blue) total of 48 surveillance pairs in this block. The number of Blue surveillance pairs is given in line 26 of block CC.

Entry Column	Description
A	Designate the number of the reporting unit of the surveillance pair, i.e., the unit at which a long range surveillance device is located.
B	Designate the unit to which the unit of column A reports. This unit must be a division, brigade, or group CP, a direct support FDC or a div arty CP.
C	The message type (DLINE index) code used in block NA to identify long range surveillance messages.
D	Type of surveillance device at the unit of column A. The device codes are those used in data block EG.
E, F	These entries apply to the unit of column B. A key for these codes is in the first form for this data block.

Reference to column F of form AA shows that company A 1-10 armor (unit 6) has one surveillance device reporting to the 1-10 armor battalion CP (unit 5). Reference to column A of block BA shows that unit 5 is the CP for group 1. Therefore, a '1' is entered in column E and also in column F. In the second pair, the headquarters being reported to is a direct support FDC (unit 9). Reference to fields C and D of block BA shows that unit 9 is indexed (in block BB) as the first Blue DS FDC. Therefore, a '3' is entered in column E and a '1' is entered in column F.

SURVEILLANCE UNIT NUMBER

	A	B	C	D	E	F
	[SURUNT]	[SURMS1]	[SURMS2] (I,1)	[TYPE]	[SURMS2] (I,2)	[SURMS2] (I,3)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
	THE SURVEILLANCE UNIT IS THE UNIT NUMBER WHERE LONG RANGE SURVEILLANCE EQUIPMENT IS LOCATED *OR WHERE AIR OP* AND OTHER SURVEILLANCE OPERATIONS ARE SIMULATED.	THIS IS THE IDENTIFICATION OF THE HEADQUARTERS TO WHICH THE SURVEILLANCE UNIT REPORTS ITS INFORMATION. *THIS HQ UNIT MUST* BE A DIVISION, BRIGADE, OR GROUP CP, A DIRECT SUPPORT FDC, OR A DIVARTY FDC.	DLINE INDEX OF MESSAGE.	SURVEILLANCE DEVICE TYPE	LOG	ROW (SEE TIN024-C)

TIN025-A

DATA BLOCK LB

LOG –	1 IF GROUP CP (INTBGP OR INTRGP); 2 IF DIVARTY FDC (INTBDA OR INTRDA); 3 IF DIRECT SUPPORT FDC (INTBDS OR INTRDS); 4 IF LONG RANGE SURVEILLANCE DEVICE (INTBLR OR INTRLR) (IT IS NOT CLEAR THAT THIS ALTERNATIVE WOULD EVER BE USED.) 5 IF BRIGADE OR DIVISION CP (INTBBD OR INTRBD)	LOG 2	– ALWAYS 1
		LOG 3–	1 FOR FIRST RED OR BLUE DIRECT SUPPORT FDC, 2 FOR SECOND RED OR BLUE DIRECT SUPPORT FDC, ETC.
		LOG 4 –	1 FOR FIRST RED OR BLUE LONG RANGE SURVEILLANCE DEVICE, 2 FOR SECOND RED OR BLUE LONG RANGE SURVEILLANCE DEVICE, ETC.
ROW –	LOG 1 – 1 FOR FIRST RED OR BLUE GROUP CP, 2 FOR SECOND RED OR BLUE GROUP CP, ETC.	LOG 5 –	BRIGADE CP – 1 FOR FIRST RED OR BLUE BRIGADE CP, 2 FOR THE SECOND RED OR BLUE BRIGADE CP, ETC. DIVISION CP – FOLLOWS LAST BRIGADE CP FOR ITS COLOR, i. e., IF THERE ARE THREE BLUE BRIGADES, THE BLUE DIVISION CP WOULD HAVE ITS LOG IN ROW 4.

TABLE IV-72, Supplemental Descriptions for Data Block OA

Number of Entries: For each column, there are as many entries as there are units subject to move orders.

Entry Column	Description
A	Only units designated in this data block will require receipt of movement orders before movement.
B	The unit issuing the move message is typically a headquarters above the unit of column A.
C	This entry identifies the message type (DLINE index) code associated with a move message sent from the column B unit to the column A unit.

A	B	C
[I]	[MVMSGI-RIGHT HALF]	[MVMSG2]
THIS DATA COLUMN LISTS THE INDICES OF UNITS THAT, DURING THE TACTICAL PLAY, WILL BE SUBJECT TO MOVE ORDERS.	FOR EACH UNIT LISTED IN THE ADDRESSEE COLUMN, THIS COLUMN CONTAINS THE INDEX OF THE UNIT THAT ISSUES THE MOVE MESSAGE.	THE NUMBERS IN THIS COLUMN ARE TAKEN DIRFCTLY FROM THE DLINE LIST. THIS NUMBER IDENTIFIES THE TYPE OF MESSAGE AS LISTED IN THE DLINE LIST THAT IS APPLICABLE.

ADDRESSEE COLUMN (I)–ALL UNITS NEED NOT BE LISTED. UNITS NOT LISTED WILL MOVE WHEN THE PATTERN START DISTANCE IS REACHED. LISTED UNITS WILL NOT MOVE UNTIL A MOVE MESSAGE IS RECEIVED. THIS LIST PUTS MANY MESSAGES INTO THE COMMUNICATIONS SIMULATOR; BUT TRANSMISSION FAILURE FOR MANY UNITS HAS NO TACTICAL IMPACT EXCEPT TO LOAD THE SYSTEM WITH COMPETING MESSAGES, AND FOR THE PURPOSES OF THIS PROJECT IT MIGHT BE JUST AS WELL TO OMIT SUCH UNITS FROM THIS LIST, EXCEPT WHERE THIS EFFECT IS DESIRED.

TIN026

DATA BLOCK OA

TABLE IV-73, Supplemental Descriptions for Data Block PA (Subblocks A-C)

Number of Entries: For each subblock enter as many values as there are battalions on both sides. Blue must comprise three brigades, numbered one through three. Red must comprise brigades four and five. Each brigade may consist of up to five battalions. Therefore, no more than 25 values would ever be entered in a subblock. Note: Each battalion corresponds to a group (defined in block BA) and a pattern (defined in CA). The units comprising each battalion are communicated to the simulator only through subblocks K and L of block PA.

Entry Sub-Block	Description
A	As enemy resistance stiffens, the force ratio may drop below the level of the number in this item. The battalion's reports to brigade are on a continuing basis, in contrast to the alternate condition of status reports at regular intervals. The purpose of this entry is to increase message loads when resistance increases.
B	Each battalion makes periodic reports to brigade. This entry specifies the time interval of these reports in minutes.
C	This is a multiplier applied to the battalion force ratio of each committed battalion. It is used by brigade to compute the brigade force ratio when the brigade has more than one battalion committed.

A

BATMFR(I,J,1)
SCALE 3

FORCE RATIO CUTOFF AT OR BELOW WHICH A STATUS REPORT SHOULD BE SENT FROM BATTALION TO BRIGADE.

B

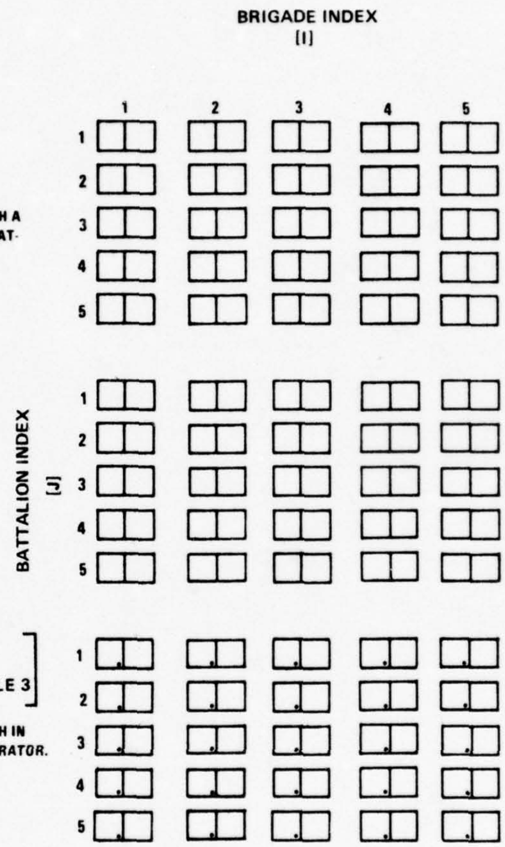
BATMFR (I, J, 2)
LEFT HALF

NOMINAL TIME IN MINS. BETWEEN MESSAGES TO BRIGADE.

C

BATMFR (I, J, 2)
RIGHT HALF-SCALE 3

WEIGHT APPLIED TO BATTALION STRENGTH IN COMPUTING BRIGADE FORCE RATIO NUMERATOR.



TIN027-A

DATA BLOCK PA

TABLE IV-74, Supplemental Descriptions for Data Block PA (Subblocks D-F)

Number of Entries: For each subblock enter as many values as there are battalions on both sides. Blue must comprise three brigades, numbered one through three. Red must comprise brigades four and five. Each brigade may consist of up to five battalions. Therefore, no more than 25 values would ever be entered in a subblock. Note: Each battalion corresponds to a group (defined in block BA) and a pattern (defined in CA). The units comprising each battalion are communicated to the simulator only through subblocks K and L of block PA.

Entry Sub-Block	Description
D	A defender unit in the yield mode (see Table IV-5) gives ground when the pressure against it builds up. This entry specifies the force ratio value that, when reached, causes a unit to enter the yield mode.
E	This is a cutoff for committing reserves. It is compared with the smallest force ratio over all units in a battalion. This cutoff allows the attacker to maintain maximum attack momentum through the commitment of additional firepower.
F	This entry determines when the attacker battalion orders units from the group (where the units are committed) back to the pattern locations (where the units are in reserve). This should occur when there is greater firepower in the group (battalion) than is necessary to maintain attack momentum. The decommitment test using entry F is as follows: Let A = battalion force ratio B = commit cutoff (entry E) C = firepower opposing the unit (in bn) with the lowest unit force ratio D = firepower against last unit (of bn) committed E = the value of this data item Then decommitment may occur if: $A \times C/(C + D)$ exceeds $B(1 + E)$

BRIGADE INDEX
[I]

BATTALION INDEX
[J]

D

BTSINP(I,J,1)
SCALE 3

FORCE RATIO TO ENTER YIELD MODE.

E

BTSINP(I,J,2)
SCALE 3

FORCE RATIO BELOW WHICH COMPANY CAN BE COMMITTED.

F

BTSINP(I,J,3)
SCALE 3

FORCE RATIO MARGIN FOR DECOMMITTMENT OF COMPANY.

TABLE IV-75, Supplemental Descriptions for Data Block PA (Subblocks G and H)

Number of Entries: For each subblock enter as many values as there are battalions on both sides. Blue must comprise three brigades, numbered one through three. Red must comprise brigades four and five. Each brigade may consist of up to five battalions. Therefore, no more than 25 values would ever be entered in a subblock. Note: Each battalion corresponds to a group (defined in block BA) and a pattern (defined in CA). The units comprising each battalion are communicated to the simulator only through subblocks K and L of block PA.

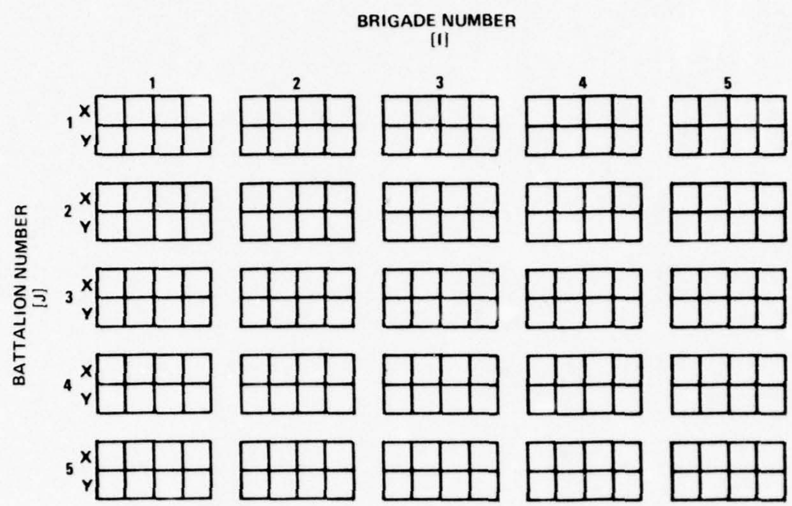
Entry Sub-Block	Description
G, H	These data establish the coordinates of the attack position when a reserve battalion is committed. The offset is measured in kilometers from the guide point the reserve battalion is using. The guide point is defined in entry X.

G,H

[BTSINP(I,J,4)]

[BTSINP(I,J,5)]

LINE OF DEPARTURE OFFSET.



TIN027-C

DATA BLOCK PA

TABLE IV-76, Supplemental Descriptions for Data Block PA (Subblocks I-L)

Number of Entries: For each subblock enter as many values as there are battalions on both sides. Blue must comprise three brigades, numbered one through three. Red must comprise brigades four and five. Each brigade may consist of up to five battalions. Therefore, no more than 25 values would ever be entered in a subblock. Note: Each battalion corresponds to a group (defined in block BA) and a pattern (defined in CA). The units comprising each battalion are communicated to the simulator only through subblocks K and L of block PA.

Entry Sub-Block	Description
I	Enter a '0' value. The options for entries '1' and '2' are not operative.
J	The objective of a battalion may be an explicit pre-established point (a terrain objective), an offset from a unit, or an actual unit. Only the terrain objective option has been exercised in current applications.
K	Each battalion has its lead combat units assigned in block BA to one and only one group. This entry contains the associated group number from data block BA.
L	Each battalion has its noncombat units assigned in block CA to one and only one pattern, the index of which is entered here.

BRIGADE INDEX
[I]

BATTALION INDEX
[J]

I

[BTNOCO(I,J,2)]

ROUTE SELECTION TYPE: 0 = IGNORE ENEMY, 1 = SEEK ENEMY, 2 = AVOID ENEMY.

	1	2	3	4	5
1					
2					
3					
4					
5					

J

[IOTYP]

OBJECTIVE: 0 = TERRAIN OBJECTIVE, 1 = OFFSET FROM LD, 2 = UNIT LOCATION, 3 = OFFSET FROM UNIT.

	1	2	3	4	5
1					
2					
3					
4					
5					

K

[BTGPNO]

GROUP INDEX.

	1	2	3	4	5
1					
2					
3					
4					
5					

L

[BTPTNO]

PATTERN INDEX.

	1	2	3	4	5
1					
2					
3					
4					
5					

TIN027-D

TABLE IV-77, Supplemental Descriptions for Data Block PA (Subblocks M and N)

Number of Entries: For each subblock enter as many values as there are battalions on both sides. Blue must comprise three brigades, numbered one through three. Red must comprise brigades four and five. Each brigade may consist of up to five battalions. Therefore, no more than 25 values would ever be entered in a subblock. Note: Each battalion corresponds to a group (defined in block BA) and a pattern (defined in CA). The units comprising each battalion are communicated to the simulator only through subblocks K and L of block PA.

Entry Sub-Block	Description
M	This entry can be used to designate a game time at which a unit in 'hold' mode (see Table IV-5) changes to 'yield' mode if this entry is positive and to 'attack' mode if this entry is negative.

M

[BATHHR]
H HOUR

BRIGADE INDEX
[I]

BATTALION INDEX [J]	1	2	3	4	5
1					
2					
3					
4					
5					

N

[BTSINP (I,J,7) (SCALE 3)]
BATTALION MOVE RATE.
KM/MIN

BATTALION INDEX [J]	1	2	3	4	5
1	. _ _ _	. _ _ _	. _ _ _	. _ _ _	. _ _ _
2	. _ _ _	. _ _ _	. _ _ _	. _ _ _	. _ _ _
3	. _ _ _	. _ _ _	. _ _ _	. _ _ _	. _ _ _
4	. _ _ _	. _ _ _	. _ _ _	. _ _ _	. _ _ _
5	. _ _ _	. _ _ _	. _ _ _	. _ _ _	. _ _ _

TIN027-E

DATA BLOCK PA

TABLE IV-78, Supplemental Descriptions for Data Block PA (Subblocks O and P)

Number of Entries: For each subblock enter as many values as there are battalions on both sides. Blue must comprise three brigades, numbered one through three. Red must comprise brigades four and five. Each brigade may consist of up to five battalions. Therefore, no more than 25 values would ever be entered in a subblock. Note: Each battalion corresponds to a group (defined in block BA) and a pattern (defined in CA). The units comprising each battalion are communicated to the simulator only through subblocks K and L of PA.

Entry Sub-Block	Description
O	This is the time (duration in minutes) required for the commit decision to be staffed at battalion.
P	This entry has two functions in the commit and decommit routine. It prevents commitment of a second company until the committed company has some force against it. Until the cutoff represented by this entry is reached, another company is not committed. Similarly, a company cannot be decommitted if 'force against' is greater than this cutoff, reasoning that the company is too heavily committed to break off.

O

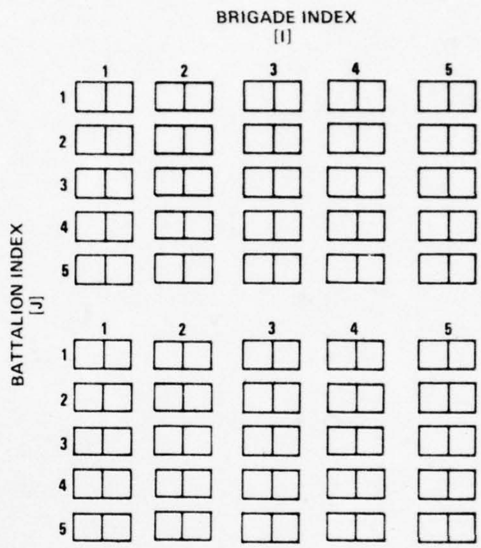
[BATDCI]

BATTALION DECISION INTERVAL.

P

[BTSINP(I,J,9)
SCALE 3]

FORCE AGAINST CUTOFF (CONTACT AND DISENGAGEMENT).



IF THE BATTALION FORCE RATIO IS LESS THAN THE FORCE RATION COMMITMENT CUTOFF, IT IS DETERMINED IF THE NUMBER OF COMMITTED COMPANIES IN THE BATTALION IS LESS THAN THE NUMBER OF COMPANIES ASSIGNED TO THAT BATTALION. IF THERE ARE UNCOMMITTED COMPANIES AVAILABLE TO THE BATTALION AND THE FORCE AGAINST THE LAST COMMITTED COMPANY IS GREATER THAN THE CONTACT AND DISENGAGEMENT CUTOFF A COMMITMENT MESSAGE IS SCHEDULED.

TABLE IV-79, Supplemental Descriptions for Data Block PA (Subblocks Q-S)

Number of Entries: For each subblock enter as many values as there are battalions on both sides. Blue must comprise three brigades, numbered one through three. Red must comprise brigades four and five. Each brigade may consist of up to five battalions. Therefore, no more than 25 values would ever be entered in a subblock. Note: Each battalion corresponds to a *group* (defined in block BA) and a *pattern* (defined in CA). The units comprising each battalion are communicated to the simulator only through subblocks K and L of block PA.

Entry Sub-Block	Description
Q	This entry represents the number of companies committed in the initial deployment. The number of companies initially committed should agree with entry A of block AA and entry I of block CA.
R	For a battalion which is or may be committed, this must be at least 1. This entry should also be less than or equal to entry Q.
S	Since a group can have no more than four line units, no value greater than four should be entered here.

BRIGADE INDEX
[I]

BATTALION INDEX
[J]

Q

[BATTCO]

NUMBER OF COMPANIES THIS BATTALION HAS COMMITTED.

	1	2	3	4	5
1					
2					
3					
4					
5					

R

[BTNOCO(I,J,1)]

MINIMUM NUMBER OF COMPANIES THIS BATTALION CAN HAVE COMMITTED.

	1	2	3	4	5
1					
2					
3					
4					
5					

S

[BTMXCO]

MAXIMUM NUMBER OF COMPANIES THIS BATTALION CAN HAVE COMMITTED.

	1	2	3	4	5
1					
2					
3					
4					
5					

TABLE IV-80, Supplemental Descriptions for Data Block PA (Subblocks T-V)

Number of Entries: For each subblock enter as many values as there are battalions on both sides. Blue must comprise three brigades, numbered one through three. Red must comprise brigades four and five. Each brigade may consist of up to five battalions. Therefore, no more than 25 values would ever be entered in a subblock. Note: Each battalion corresponds to a group (defined in block BA) and a pattern (defined in CA). The units comprising each battalion are communicated to the simulator only through subblocks K and L of block PA.

Entry Sub-Block	Description
T	This value should be greater than the staff time for a commit decision (entry O).
U	In the absence of other information, set this entry equal to entry T.
V	If the attrition-distance-time counter (ADTC) of any committed company is greater than this entry, then the battalion commander cannot act to reinforce. A high value of ADTC implies an extended period of poor communications.

T

[BTSINP(I,J,10)
LEFT HALF]

MINIMUM TIME BETWEEN COMMITMENTS.
(IN MINUTES)

U

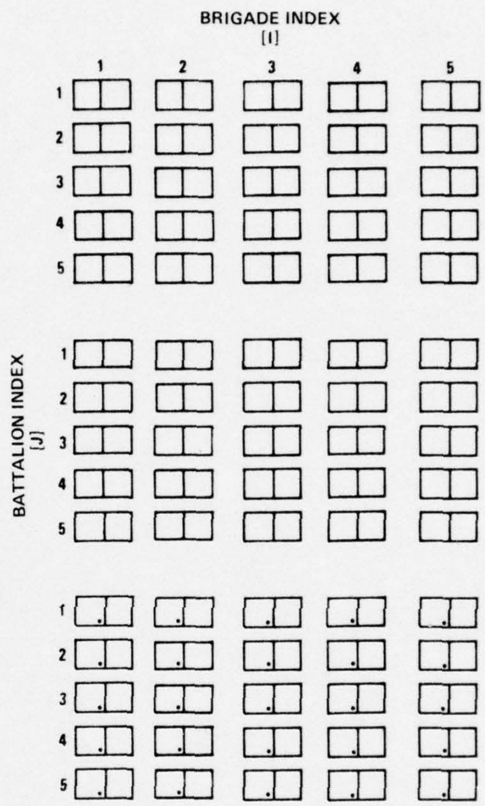
[BTSINP(I,J,10)
RIGHT HALF]

MINIMUM TIME BETWEEN DECOMMITMENTS.
(IN MINUTES)

V

[BTSINP(I,J,8)
SCALE 4]

ADTC CUTOFF FOR STATUS REPORT.



TIN027-H

TABLE IV-81, Supplemental Descriptions for Data Block PA (Subblocks W-Y)

Number of Entries: For each subblock enter as many values as there are battalions on both sides. Blue must comprise three brigades, numbered one through three. Red must comprise brigades four and five. Each brigade may consist of up to five battalions. Therefore, no more than 25 values would ever be entered in a subblock. Note: Each battalion corresponds to a group (defined in block BA) and a pattern (defined in CA). The units comprising each battalion are communicated to the simulator only through subblocks K and L of block PA.

Entry Sub-Block	Description
W	When the distance between an attacking battalion and its designated terrain objective is less than this distance (km), the battalion cannot decommit companies. Similarly, until a defender battalion in yield mode (see Table IV-5) is within this distance from its objective, it cannot commit its reserve companies. The values entered here should be such that attacker does not decommit when about to reach its objective, and a defender in yield mode does not commit its reserve until the defender arrives in a reasonable 'hold' position.
X	The control unit of the pattern from which the reserve battalion locates its attack position when committed.
Y	If entry J specifies a unit objective, the unit number (from the unit list of block AA) is entered here.

BRIGADE INDEX
[I]

BATTALION INDEX
[J]

W

[BTSINP(I,J,6)]

YIELD COMMITMENT OR PROXIMITY DISTANCE.

	1	2	3	4	5
1					
2					
3					
4					
5					

X

[BTSINP(IJ,11)]
LEFT HALF

GUIDON UNIT INDEX.

	1	2	3	4	5
1					
2					
3					
4					
5					

Y

[BTSI1NP(I,J,11)
RIGHT HALF]

UNIT NUMBER FOR UNIT OBJECTIVE.

	1	2	3	4	5
1					
2					
3					
4					
5					

TABLE IV-82, Supplemental Descriptions for Data
Block PA (Subblock Z)

Number of Entries: For each subblock enter as many values as there are battalions on both sides. Blue must comprise three brigades,* numbered one through three. Red must comprise brigades four and five. Each brigade may consist of up to five battalions. Therefore, no more than 25 values would ever be entered in a subblock. Note: Each battalion corresponds to a group (defined in block BA) and a pattern (defined in CA). The units comprising each battalion are communicated to the simulator only through subblocks K and L of block PA.

Entry Sub-Block	Description
Z	The locations of final terrain objectives are entered here.

Only the first line of each subblock is entered. These values are associated with the first battalion in each of five brigades. Brigades 1, 2 and 3 are Blue and brigades 4 and 5 are Red (a fixed requirement). From entries K and L, note that these five battalions correspond to groups 1, 6, 9, 13 and 16 respectively (in block BA), and to patterns 1, 6, 9, 23 and 26 respectively (in block CA). Each of the given Blue battalions has three battalions initially up, while the corresponding figure for Red is four (entry Q). Each battalion will always have at least two companies committed (entry R), but no more than three shall be committed by Blue, and no more than four by Red (entry S). Each battalion has a basic 15 km/hr move rate (entry N). Commitments and decommitments of companies must be separated by intervals of at least 15 minutes (entries T and U). A company cannot be committed unless the battalion force ratio falls below 3.5 (entry E). Battalion objectives are preestablished points (entry J) and are designated in entry Z. When an attacking battalion is within 2 km of its objective, it can no longer decommit companies (entry W). Assume

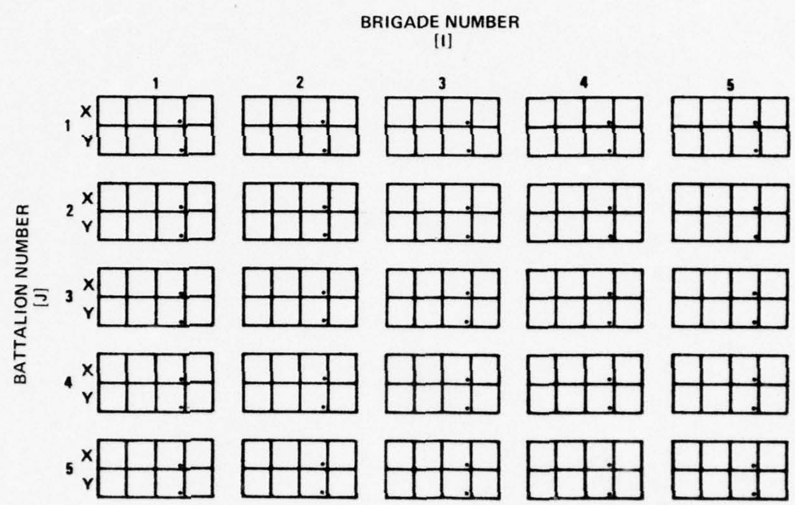
---

*Regimental headquarters may be substituted for brigades on a one-for-one basis. The same rules for subordinate units apply.

now that, of all the battalions shown, the third brigade alone was initially set in 'reserve' mode (see Table IV-4) in block BA. In that case, this battalion will, when committed, move from the line of departure to an attack position 7.5 km (entries G and H) behind unit 18 (entry X). The latter should be a command post of an initially committed battalion. With respect to status reports, each battalion sends reports to brigade at 30-minute intervals (entry B). If the battalion force ratio falls below 5, the frequency of reports to brigade increases. If the attrition-distance-time counter of any committed company is less than 2.5, then the battalion commander cannot commit reserve companies (entry V).

Z

[BATOBJ(I,J,1)]
[BATOBJ(I,J,2)]
COORD. FINAL OBJECTIVE.



TIN027-J

DATA BLOCK PA

TABLE IV-83, Supplemental Descriptions for Data Block PB

Number of Entries: For each line enter one value for each division force (Blue and Red).

Entry Line	Description
A	The number of Blue brigades should be five, and there should be two Red brigades.
B	This is the number of the brigade making the main attack or defense effort. Red brigade numbers (4 and 5) follow Blue brigade numbers (1, 2 and 3).
C	This is the number of brigades each division has initially committed.
D	From the unit list of block AB, this is the unit number of the division command post.
E	Division cannot commit a reserve brigade unless the brigade force ratio falls below this figure and brigade has committed its own reserve.
F	If the time since the last status reports from any of the committed brigades were received is greater than this time interval, then division cannot commit a reserve brigade.
G	This is the staff time for a commit decision at division headquarters.

The Blue force has three brigades, two of which are initially committed, with the first brigade bearing the main attack effort. The Red force has two brigades, both of which are initially committed. The first Red brigade (number 4) bears the main defense effort. Unit 1 is the Blue division CP and unit 122 the Red CP. If Blue (attacker) brigade force ratio falls below 2.0, then division may commit a reserve brigade. Red (defender) can commit a reserve brigade after the Red brigade force ratio falls below .66. Neither (Red or Blue) division commander can commit a reserve brigade if status reports have not been received from all committed brigades during the last hour. Staffing time for a commit decision at brigade headquarters is 30 minutes.

DIVISION
(I)

LIST IN SEQUENCE, BLUE THEN RED.

		1	2
A	[DIVBRG(I,1)] NUMBER OF BRIGADES IN DIVISION.		
B	[DIVBRG(I,2)] INDEX OF MAIN EFFORT BRIGADE.		
C	[DIVCMT] NUMBER OF COMMITTED BRIGADES IN DIVISION.		
D	[DIVHQN] UNIT NUMBER OF DIVISION HEADQUARTERS.		
E	[DIVACT(I,1) SCALE 3] FR CUTOFF TO COMMIT RESERVE BRIGADE.		
F	[DIVACT(I,2) RIGHT HALF] ACTION CUTOFF TIME. (IN MINUTES)		
G	[DIVACT(I,2) LEFT HALF] TIME REQUIRED FOR DECISION AT DIV HQ. (IN MINUTES)		

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COMMEL II USER'S MANUAL. VOLUME II. INPUT DATA PREPARATION.(U)

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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

TABLE IV-84, Supplemental Descriptions for Data Block PC (Lines A-I)

Number of Entries: For each line enter one value for each brigade. There can be no more than five brigades in the simulation.

Entry Line	Description
A	This entry should agree with the number of battalions designated in block PA.
B	This is the number of initially committed battalions in each brigade. A battalion in reserve status is so designated (group mode = 3) in entry column G of block BA.
C, D	These values are in kilometers and replace the offset values for the reserve battalion pattern when committed.
E	Each committed brigade sends a status report to division when its force ratio falls below this figure.
F	If the brigade force ratio exceeds this value, the brigade will not commit a reserve battalion.
G	If a defender chose to defend by delaying from the FEBA, the distance of a yielding or leapfrogging battalion from its route objective is compared to this cutoff. If this distance is less than this cutoff, the brigade commits its reserve battalion(s).
H	Interval between scheduled status reports from brigade to division.
I	If a brigade has not had contact (via status reports) with each of its committed battalions within this time interval, then it cannot commit a reserve battalion.

BRIGADE INDEX
[I]

		1	2	3	4	5
A	[BRGBAT] NUMBER OF BATTALIONS IN BRIGADE.					
B	[BRGCBT(I,1)] NUMBER OF COMMITTED BATTALIONS IN THIS BRIGADE.					
C	[BRGCRD(I,1)] X COORDINATE PATTERN OFFSET. X					
D	[BRGCRD(I,2)] Y COORDINATE PATTERN OFFSET. Y					
E	[BRGCTS(I,1) SCALE 3] FORCE RATIO CUTOFF AT OR BELOW WHICH A STATUS REPORT SHOULD BE SENT FROM BRIGADE TO DIVISION.					
F	[BRGCTS(I,2) SCALE 3] FORCE RATIO CUTOFF BELOW WHICH A BATTALION CAN BE COMMITTED.					
G	[BRGCTS(I,3) SCALE 3] RESERVE BATTALION COMMIT CUTOFF. DISTANCE OF MAIN EFFORT YIELDED FROM FINAL POSITION.	.	.	.	.	.
H	[BRGCTS(I,4) LEFT HALF] TIME INTERVAL AT OR ABOVE WHICH A STATUS REPORT SHOULD BE SENT FROM BRIGADE TO DIVISION. (IN MINUTES)					
I	[BRGCTS(I,4) RIGHT HALF] ACTION CUTOFF TIME. (IN MINUTES)					

TIN029-A

DATA BLOCK PC

TABLE IV-85, Supplemental Descriptions for Data Block PC (Lines J-O)

Number of Entries: For each line enter one value for each brigade. There can be no more than five brigades in the simulation.

Entry Line	Description
J	Unit numbers should agree with designations assigned in block AB.
K	This is the time required to staff a brigade decision to commit a reserve battalion.
L	Index (from the brigade index of block PA) of the main effort battalion.
M	This indicates how many battalions each brigade has up initially. It must be at least one.
O	This multiplier enables greater weight to be given to the main effort brigade force ratio when computing the division force ratio.

Blue comprises 11 battalions in three brigades, six of which are initially committed; the rest being in reserve (group mode = 3). The Red force has two brigades with a total of seven battalions. Six of the seven Red battalions are initially committed. The first battalion of each brigade is the main effort battalion. Status reports from Blue brigade to division are sent at 30 minute intervals and whenever a brigade force ratio falls below 3.0. Red status reports are sent to (Red) division at 60 minute intervals and whenever a Red brigade force ratio falls below 1.0. A Blue brigade cannot commit a reserve battalion if its force ratio exceeds 1.0 or if it has not received status reports from each of its committed companies during the past half hour. A commit order requires 15 minutes staff time at brigade. Only one reserve battalion at a time is committed. Analogous remarks apply to the Red force. In computing the Blue division force ratio, the second Blue brigade carries a lesser weight (.5) than the first or third brigades (1.0). For the analogous Red force computation, both Red brigades carry equal weight (1.0).

BRIGADE INDEX
[I]

	Variable	1	2	3	4	5
J	[BRIGHQ RIGHT HALF] UNIT NUMBER OF BRIGADE HEADQUARTERS.					
K	[BRGINT] BRIGADE DECISION INTERVAL. (IN MINUTES)					
L	[BRGMEB(I,1)] INDEX OF BRIGADE MAIN EFFORT BATTALION.					
M	[BRGMEB(I,2)] MINIMUM NUMBER OF BATTALIONS THIS BRIGADE CAN HAVE *COMMITTED.*					
N	[BRGRES] NUMBER OF RESERVE BATTALIONS TO BE COMMITTED AT THE SAME TIME.					
O	[BRGWT-SCALE 3] VALUE USED TO WEIGHT BRIGADE FORCE RATIO TO COMPUTE DIVISION FORCE RATIO.	.	.	.	.	.

TIN029-B

DATA BLOCK PC

TABLE IV-86, Supplemental Descriptions for Data Block PD

Number of Entries: There should be no more than 19 entries per column.

Entry Column	Description
Index	Group number, which should cross-reference with the index of block BA.
A	When companies are committed or decommitted, this column specifies the coordination pairs deleted on commitment or added on decommitment if this is a flank unit. For a flank unit, a company of one battalion may coordinate with a unit of another battalion if it is the only company committed in its battalion.
B	In the usual case, a coordination pair would be added when companies are committed and deleted on decommitment. Designation in this data block is necessary in order to insure that coordination messages are generated between newly committed units.
C	If three companies are committed, they form two coordinating pairs. In such a case, column B designates the first pair and the second is entered here.

In the example shown, line units 6 and 7, when committed, will cause coordination messages to be exchanged between them. Also, the coordination level counter will be activated at that time. When units 6 and 7 are decommitted, they will be removed from consideration by all coordination routines. All pairs of units which coordinate should be deployed so as to be initially adjacent.

UNIT NUMBERS OF LINE COMPANIES IN THE GROUP THAT EXCHANGE COORDINATION MESSAGES.

GROUP INDEX ESTABLISHED IN CONAME [I]

	A [CORDAD (I, J, 1)]		B [CORDAD (I, J, 2)]		C [CORDAD (I, J, 3)]	
	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						

COORDINATION PAIR DELETED ON COMMITMENT, ADDED ON DECOMMITMENT. ZERO IF THIS IS A FLANK UNIT. FIRST

FIRST COORDINATION PAIR ADDED ON COMMITMENT, DELETED ON DECOMMITMENT.

.COND COORDINATION PAIR ADDED ON COMMITMENT, DELETED ON DECOMMITMENT.

TIN030

DATA BLOCK PD

TABLE IV-87, Supplemental Descriptions for Data Block QA

Number of Entries: There is one value per column for each DS FDC in each force, for a total of six.

Entry Column	Description
A, B	Artillery target value at an FDC is computed as the product of: 1) intelligence logged on the target. 2) a distance function (from column A and B of data block EC). 3) a weight function (from column A and B of data block AT).
C	The artillery routines use this data block to simulate timely GS artillery fire in answer to help requests from DS battalions.

DIRECT SUPPORT FDC [I]		A DACUTSLO	B DACUTSHI	C PRIORITY
BLUE DS	1			
	2			
	3			
RED DS	4			
	5			
	6			

DACUTSLO – THIS IS THE LOWER CUTOFF VALUE (TARGET WEIGHT) A TARGET MUST HAVE BEFORE A DS FDC IS PERMITTED TO ASK DIV ARTY FOR HELP. A TARGET WITH THIS WEIGHT, CONFRONTING A DS BATTALION, AND UPON WHICH THE DS BATTALION IS UNABLE TO FIRE (FOR VARIOUS REASONS), IS PASSED ALONG BY DIV ARTY TO THE GS FDC DEPENDING ON THE IMPORTANCE OF THE ACTION THE DS ARTY BN IS SUPPORTING; i.e., THE DS BATTALION SUPPORTING THE MAIN ATTACK MAY HAVE A LOWER CUTOFF THAN A DS BATTALION SUPPORTING A SECONDARY ATTACK. AT ANY RATE, ONLY WHEN THE DS FDC IS UNABLE TO FIRE AND THE TARGET WEIGHT EXCEEDS DACUTSLO (BUT IS LESS THAN DACUTSHI) IS THE DS FDC PERMITTED TO ASK DIV ARTY FOR HELP.

DACUTSHI – THIS IS AN UPPER CUTOFF. WHEN A DS FDC HAS A TARGET OF THIS WEIGHT IT CALLS ON DIV ARTY FOR ADDITIONAL FIRE, ALTHOUGH THE DS FDC IS FIRING ON THE TARGET.

PRIORITY – THIS FACTOR IS INCLUDED TO INSURE THAT THE BULK OF THE GS FIRE GOES TO THE MAIN ATTACK. GS WILL GIVE PRIORITY TO THE DS FDC WITH THE HIGHER VALUE IN THIS DATA COLUMN.

TIN031

DACUTS (I, J), J = 1, 3

DATA BLOCK QA

TABLE IV-88, Supplemental Descriptions for Data Block RA

Number of Entries: Enter exactly 80 values on each line. Exactly 40 lines should be filled in. When completely filled in, the data block represents an 80 km x 40 km area (sample forms illustrate only a 40 x 20 grid). Each grid square is 1 x 1 km. Grid coordinate 1, 1 on these forms equates to the absolute grid origin on data block AAA incremented by 1 km along each axis.

Entry Type	Description
Mobility Index	The entry must be an integer between 1 and 5. See chapter II, section 2.
Obstacle Index	The entry should be a decimal number between 0 and 5. Grid squares without obstacles have a value of zero.

Refer to chapter II, section 2 for a detailed discussion of the mobility and obstacle indexes.

INTEGER PART OF X COORDINATE
[I]

INTEGER PART OF Y COORDINATE
[J]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20																				

MOBILITY INDEX

INDEX EACH GRID SQUARE WITHIN THE ZONE OF ACTION WITH THE MOBILITY INDEX. THIS INDEX RANGES OVER THE INTEGERS FROM 1 TO 5 ACCORDING TO THE GENERAL TERRAIN PRESENTED BY THE GRID SQUARE. THE TERRAIN IN EACH GRID SQUARE IS CLASSIFIED UNDER ONE OF FIVE CATEGORIES:

TYPE 1 – GENERALLY FLAT, OPEN TERRAIN WITH GOOD MANEUVERING. MAY OR MAY NOT HAVE ROADS. MOBILITY INDEX IS 1.

TYPE 2 – MODERATELY OPEN, ROLLING TERRAIN. FLEXIBILITY IN MANEUVER AVAILABLE. MOBILITY INDEX IS 2.

TYPE 3 – MODERATELY CLOSE, ONE-THIRD TO ONE-HALF COVERED BY HEAVY WOODS OR STEEP GRADES. FREE TANK MOVEMENT RESTRICTED. MOBILITY INDEX IS 3.

TYPE 4 – CLOSE TERRAIN, TANK MOVEMENT LIMITED. RECONNAISSANCE NECESSARY. MOBILITY INDEX IS 4.

TYPE 5 – RUGGED TERRAIN. TANK MOVEMENT LIMITED TO RECONNOITERED ROUTES, AND ENGINEER ASSISTANCE NECESSARY. MOBILITY INDEX IS 5.

TIN032-A

DATA BLOCK RA

INTEGER PART OF X COORDINATE (CONT'D)
[I]

INTEGER PART OF Y COORDINATE (CONT'D)
[J]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21																				
22																				
23																				
24																				
25																				
26																				
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36																				
37																				
38																				
39																				
40																				

MOBILITY INDEX

INDEX EACH GRID SQUARE WITHIN THE ZONE OF ACTION WITH THE MOBILITY INDEX. THIS INDEX RANGES OVER THE INTEGERS FROM 1 TO 5 ACCORDING TO THE GENERAL TERRAIN PRESENTED BY THE GRID SQUARE. THE TERRAIN IN EACH GRID SQUARE IS CLASSIFIED UNDER ONE OF FIVE CATEGORIES:

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TYPE 2 – MODERATELY OPEN, ROLLING TERRAIN. FLEXIBILITY IN MANEUVER AVAILABLE. MOBILITY INDEX IS 2.

*TYPE 3 – MODERATELY CLOSE, ONE-THIRD TO ONE-*HALF COVERED BY HEAVY WOODS OR STEEP GRADES. FREE TANK MOVEMENT RESTRICTED. MOBILITY INDEX IS 3.

TYPE 4 – CLOSE TERRAIN, TANK MOVEMENT LIMITED. RECONNAISSANCE NECESSARY. MOBILITY INDEX IS 4.

TYPE 5 – RUGGED TERRAIN. TANK MOVEMENT LIMITED TO RECONNOITERED ROUTES, AND ENGINEER ASSISTANCE NECESSARY. MOBILITY INDEX IS 5.

TIN032-A (Cont'D)

DATA BLOCK RA

INTEGER PART OF X COORDINATE

[I]

INTEGER PART OF Y COORDINATE [J]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1																				
2																				
3																				
4																				
5																				
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17																				
18																				
19																				
20																				

OBSTACLE INDEX

DATA BLOCK RA

TIN032-B

INTEGER PART OF X COORDINATE (CONT'D)
[I]

INTEGER PART OF Y COORDINATE (CONT'D)
[J]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21																				
22																				
23																				
24																				
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38																				
39																				
40																				

OBSTACLE INDEX

DATA BLOCK RA

TIN032-B (Cont'd)

TABLE IV-89, Supplemental Descriptions for Data Block RB

Number of Entries: One per line.

Line	Description
A, B	These entries are used in computing terrain class. The formula for terrain class is: terrain class = 3 x M + Q - 3 Where M = mobility index (defined in data block RA) and Q is defined by: Value of Terrain Obstacles Index / Value of Q 0 to line A: 1 line A to line B: 2 line B to 5.0: 3 A detailed description of terrain indexing is provided in chapter II, section 2.
C,D,E	These entries are treated as the sum of the observation and field of five index and the concealment index for mobility index values. They are used in computing terrain index. For a fuller treatment, see Chapter II, section 2.

TERRAIN CONSTANTS

A	[HGHOB1]	☐.☐
B	[HGHOB2]	☐.☐
C	[FC1]	☐.☐
D	[FC2]	☐.☐
E	[FC3]	☐.☐

TABLE IV-90, Supplemental Descriptions for Data Block WE (Column A)

Number of Entries: One value for each weapon type in each unit type in the Red force.

Entry Column	Description
A	A numeric rating of effectiveness of fire from each Blue weapon type against each Red unit type. These numbers are used to downgrade weapon fire when the weapon is employed against an unsuitable target.

A

MEASURE OF EFFECTIVENESS OF WEAPON TYPE AGAINST ATTACKER UNIT TYPE
(MODE CODE = 1)

UNIT TYPE

WEAPON TYPE (BLUE)	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										

TIN034-A FYRFAC-RIGHT HALF- (SCALE 1) DATA BLOCK WE

TABLE IV-91, Supplemental Descriptions for Data Block WE (Column B)

Entry Column	Description
B	This entry is analogous to column B except that it rates effectiveness of Red weapons against Blue units.

For example purposes, only the first two rows and columns are filled in. The entries given in the example are closely related to the combat values. In fact, the example does not discriminate among unit types. There are insufficient data on the effect of variation of parameters in this data block. It is recommended that this data be based on the 'combat values' input in block EB.

B

MEASURE OF EFFECTIVENESS OF WEAPON TYPE AGAINST DEFENDER UNIT TYPE

(MODE CODE = 2)

UNIT TYPE

WEAPON TYPE (RED)	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										

TIN034-B

FYRFAC-RIGHT HALF-

(SCALE 1)

DATA BLOCK WE

CHAPTER IV
INPUT DATA BLOCKS AND ENTRY FORMS

SECTION 2
COMMUNICATIONS INPUT DATA

1. Data Blocks. - The communications data base contains the inputs which are read by the communications submodel or the background traffic submodel of COMMEL. The tactical data blocks described in section 1 were input into the tactical submodel of COMMEL. There are 17 communications data blocks, each of which is described on one or more data entry forms. In addition to these 17 blocks, this section describes tactical block NA that defines the characteristics of tactical messages. The order of presentation of the 18 data blocks is alphabetical as follows:

Block Name

ARCLOG	PRELOG	STC
CHANELOG	ROUTELOG	TYPELOG
CONSTANTS	SETLOG	USAGELOG
DAMAGLOG	SETYPLOG	UTECHFAC
DELAYLOG	STA	VULNRLOG
NA (tactical data block)	STB	WIRELOG

2. Presentation Format. - The method of data presentation in this section parallels that of section 1. Following this page is a complete set of communications data entry forms encompassing all 18 data blocks previously described. Accompanying each form is a supplementary data description table, keyed to the entry columns of the forms. Example values are entered on the entry forms and these are discussed in a commentary which usually follows the last supplementary description table of each data block.

3. Use of Data Forms. - The data forms shown are neither unused nor complete. Should the user desire to record a complete set of COMMEL communications data, a complete set of unused communications data entry forms may be obtained from the issuing office of this document. After generating a complete input data set on the appropriate entry forms, the user can read Chapter V that will enable him to translate the data entries into ADP card formats directly readable by the COMMEL Model. In the lower corner of each data form is an Input Form identification which is used to cross-reference with the format descriptions in Chapter V.

TABLE IV-92, Example Arc Types

Types Out When End Unit Moves

Type	Description
01	Common user - VHF multichannel voice
02	Sole user - VHF multichannel voice
03	Common user - VHF multichannel teletype
04	Common user cable voice (field wire)
05	Not used
06	Common user cable teletype (field wire)

Types Unaffected by Unit Movement

Type	Description
11	Common user - VHF multichannel voice
12	FM radio - voice/command
13	HF/SSB voice - cav sqdn cmd
14	HF/SSB RATT - opns/intel
15	FM radio - voice/admin-log
16	HF/SSB RATT - admin/log
17	Common user - VHF multichannel teletype
18	Sole user - VHF multichannel voice

TABLE IV-93, Mode/Usage Codes

Mode (Prefixes Usage Code)

1 = Written

0 = Voice

Usage

01 = VHF - sole user voice

02 = Wire - common user voice

03 = FM voice cmd/opns/intell

04 = SSB voice cmd

05 = RATT - opns/intell

06 = RATT - admin/log

07 = Wire - common user teletype

09 = VHF - common user voice

10 = FM voice admin/log

TABLE IV-94, Tactically Essential Messages

Message Type	Content
1	Coordination between front line companies
2	Intelligence report from company to battalion
3	Intelligence report from Arty FO to DS-FDC
4	Status reports from company to battalion
5	Fire mission from FO to DS-FDC
6-8	Not used
9	Commit: battalion to company
10	Not used
11	Decommit: battalion to company
12	Fire mission: Div Arty to GS battalion (target of opportunity)
13	Not used
14	Fire mission: Div Arty to GS battalion (help mission)
15-19	Intelligence exchange and adjustment
20-24	Not used
25	Long range intelligence report (ground OP)
26	Long range intelligence report (air OP)
27	Airborne infrared and radar surveillance
28	Air OP with airborne target locator
29-35	Not used
36	Move: Div main CP to div alt CP
37	Move: Div Arty to battalions
38	Move: Div sqdn to cav trp
39	Move: Spt cmd to spt battalions
40	Move: Div to sig battalion
41	Help request: DS FDC to div arty FDC
42	Status report: battalion to brigade
43	Move: battalions to companies
44	Commit: brigade to battalion
45	Status report: brigade to division
46	Commit: Division to brigade
47	Move: Division to brigade
48	Move: Brigade to battalion
49	Move: Signal battalion to signal company
50	Not used

TABLE IV-95, Supplemental Descriptions for Data Block ARCLOG (Columns A-F)

Number of Entries: As many entries per column as there are links. Input for links belonging to the same net should be entered together. Input for nets should be entered in numerically increasing order. Blue ARCLOG should be separate from Red ARCLOG. Each side should have no more than 890 arcs. (Sample forms show only 20 arcs.)

Entry Column	Description
A	All arcs in a single radio net have the same net number. A net may consist of a single link. Nets should be input in numerical order in ARCLOG. This column cross-references with the 'Net Number' field of CHANELOG.
B, C	Unit names associated with the unit numbers can be found in tactical data block AA.
D, E	T1 and T2 refer to the units of columns B and C respectively. Connect times from applications include: Sole User Link — 2 seconds (each terminal) Common User Link — 14 seconds (each terminal) FM Radio Voice Link — 6 seconds (each terminal) RATT Link — 10 seconds (each terminal)
F	Arc type values less than 10 correspond to arcs which are out of service during a move. Arcs (links) of types greater than 10 are not affected by unit movement. Example arc types are shown in Table IV-92. A single code is used throughout the system for similar links.

ARC NUMBER [I]	A	B	C	D	E	F
		ARCLOG (I,6) RIGHT HALF	ARCLOG (I,6) LEFT HALF	[ARCLOG (I,1)]	[ARCLOG (I,2)]	[ARCTYP]
	THE NUMBER OF THE NET TO WHICH THE ARC BELONGS	THE UNIT NUMBER OF THE FIRST END UNIT (TERMINAL) OF EACH ARC.	THE UNIT NUMBER OF THE OTHER END UNIT OF EACH ARC.	THE AVERAGE TIME IN SECONDS REQUIRED TO CONNECT THIS ARC AT UNIT T1.	THE AVERAGE TIME IN SECONDS REQUIRED TO CONNECT THIS ARC AT UNIT T2.	ONE OF A SET OF CODE NUMBERS USED TO DESIGNATE DIFFERENT TYPES OF ARCS. THIS SET OF NUMBERS CONSISTS OF AS MANY NUMBERS AS ARE REQUIRED TO DIFFERENTIATE THE NUMBER OF ARC TYPES REQUIRED TO DESCRIBE THE COMMUNICATIONS SYSTEM IN THE MANNER AND DETAIL DESIRED.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

CIN001-A

DATA BLOCK ARCLOG

TABLE IV-96, Supplemental Descriptions for Data Block ARCLOG (Columns G-J)

Number of Entries: There are as many entries per column as there are links. Links belonging to the same net should be entered together. Nets should be entered in numerically increasing order. Blue ARCLOG should be separate from Red ARCLOG. Each side should have no more than 890 arcs.

Entry Column	Description
G	A multiplier used to change the length of each message transmitted over the link. The arc multiplier used for half duplex operation is (currently) 1.50 while that for full duplex operation is 1.00.
H	This decimal fraction represents the relative 'cost' of using this arc to establish a route. The program uses this column in establishing preferences for initial route selection. Lowest 'cost' is most preferred. Current values used are: a) .02 for sole user arcs b) .15 for most common user VHF arcs c) .23 for FM radio voice arcs d) .30 for most wire arcs e) .45 for RATT arcs Using this valuation scheme, the most preferred arc would be a sole user link (if available) that has a connect time of 2 seconds at each terminal and in which the message is not delayed because the link is full duplex.
I, J	As currently used, only wire and common user - VHF links are connectable (extendable) at either end.

ARC NUMBER [I]	A	G	H	I	J
	NET NUMBER	[ARCLOG,(I,4)] THE ARC MULTIPLIER. THE LENGTH OF EACH MESSAGE TRANSMITTED OVER THIS ARC IS MULTIPLIED BY THIS VALUE TO DETERMINE THE TIME REQUIRED TO TRANSMIT THE MESSAGE.	[ARCLOG(I,5)] A DECIMAL FRACTION REPRESENTING THE RELATIVE VALUE OF USING THIS ARC TO ESTABLISH A ROUTE. THESE VALUES TOGETHER WITH THOSE GIVEN IN CONCST FOR CONNECTING ARCS ARE USED BY THE SUBROUTINE RUTING IN SELECTING THE OPTIMUM ROUTE BETWEEN TWO UNITS.	[ARCFLG(I,1)] A MINUS SIGN IF THE ARC AT T1 CANNOT BE CONNECTED TO ANY OTHER ARC; OTHERWISE, BLANK.	[ARCFLG(I,3)] A MINUS SIGN IF THE ARC AT T2 CANNOT BE CONNECTED TO ANY OTHER ARC; OTHERWISE, BLANK.
1		.			
2		.			
3		.			
4		.			
5		.			
6		.			
7		.			
8		.			
9		.			
10		.			
11		.			
12		.			
13		.			
14		.			
15		.			
16		.			
17		.			
18		.			
19		.			
20		.			

CIN001-B

DATA BLOCK ARCLOG

TABLE IV-97, Supplemental Descriptions for Data Block ARCLOG (Columns K-N)

Number of Entries: As many entries per column as there are links. Links belonging to the same net should be entered together. Nets should be entered in numerically increasing order. Blue ARCLOG should be separate from Red ARCLOG. Each side should have no more than 890 arcs.

Entry Column	Description
K, L	The explanatory key for radio equipment types is found in the description of data block SETLOG. The set type is used in determining the transmission range of the link between T1 and T2 (units of fields B and C respectively).
M, N	Details concerning damage class characteristics may be found in the comments on data block DAMAGLOG.

The example nets shown can be individually described as follows:

1. This data structure can be used to design most single channel ratio nets. For example, hypothesize a net with three units (e.g., unit 1 is Div CP, unit 4 is 1st Bde CP and unit 5 is 2nd Bde CP). Net number 1 (see column A) then allows all units to talk to each other, but only one unit can be on the air (transmitting) at any one time. Net 1 could be the beginning of a net structure for the division FM command/operations net.

2. Net 2 (column A) is a HF/SSB RATT operation/intelligence net (column F = 14), full duplex (column G = 1.00), not connectable (I, J = -), of low priority (column H = .45), taking 10 seconds to connect at any terminal (column D, E = 10), using set type 02 (column K, L) in damage class 2 (column M, N). Net 3 is the same as net 2 but is used for admin/log.

3. Net 8 is similar to net 1, except for column F which changes from 12 in net 1 to 15 in net 8 indicating that this is the brigade FM voice admin/log net (as opposed to an FM voice command net in net 1).

4. Net 42 is in a HF/SSB voice cav sqdn command net (column F = 13). It is half duplex (column G = 1.50), and has the same priority as FM command nets (column H = .23). Its equipment is in the same damage class as any other single channel receiver/ transmitter (column M, N) but its radio set types (column K, L) is different from those in net 1.

5. Net 50 is a single link common user voice cable system which goes out when an end unit displaces (column F = 04). It is full duplex (column G = 1.00), and has a lower priority than FM radio ('cost' in column H is .30 for wire and .23 for radio). It is preferred over RATT (for which column F = .45). The arc is connectable at both ends (columns I, J are blank). The equipment at both terminals is of set type 05 (columns K, L) and is in damage class 3 (columns M, N). The comments on data block CHANELOG note that there are 4 channels on this cable. These can be used as if they were four separate circuits/links.

6. Net 53 is similar to net 50 except that it is for teletype (column F = 06).

7. Net 127 is a sole user multichannel voice link (column F = 02) with low connect time (columns D, E = 2 sec), is full duplex (column G = 10), cannot be connected (columns I, J = -) and has greatest preference for use in initial route selection (column H = .02). The VHF terminals are of set type C4 (fields K, L) in damage class 4 (columns M, N). Since column F is less than 10, all circuits of the arc are out when the terminal unit displaces.

8. Net 185 is the same as net 127 except that links are unaffected by end unit displacement, as evidenced by column F = 18, a value greater than 10. This simulates a special advance command post setup. Such a system does not penalize the signal officer for having a poor/slow displacement capability, but rather gives him credit for planning ahead with the assets available for a jump. As the net is modeled, the CP is initially provided links, some of which are not affected by unit displacement. When a unit moves only those links which are type (column F) coded above 10 remain available. Due to program restrictions, the only way to model a TAC CP is to apply the principle embodied in net 185 to the main CP and assume that the main CP, tactically, will be anywhere the decision maker is located. Therefore, only main CP's are played.

9. Net 133 is common user VHF multichannel voice net (column F = 01) using equipments of set type 4 (columns K, L) at each terminal. Connect time at each terminal is 28 seconds (column D, E). The link is full duplex (column G = 1.00) and becomes inoperative when

either end unit is displacing (column F = 01 is less than 10). The link is connectable at both end units (columns I, J are blank).

10. Net 191 has the same characteristics as net 133 except that column F (= 11 - coded greater than 10) indicates that all circuits remain up while either end unit is moving.

11. Net 136 has common user VHF multichannel teletype circuits which are out when the unit displaces (indicated by column F = 03). Both terminals of the link use set type 04 (column K, L).

12. Net 194 has the same characteristics as net 136 except that link operation is unaffected by unit displacement. The combination of net 194 and net 136 would be a model representation of a single net (in the 'real world') with circuits having varying susceptibility to unit movement.

13. Net 171 is wire teletype (column F = 06) and is similar to net 53 except for a higher preference for use (column H = .15 vs .30 in net 53). This field was changed due to the heavier reliance on wire by DIVARTY relative to other units.

14. Net 175 is similar to net 50 except for use preference (column H). As currently used, wire is never permitted to be coded 'operational while unit moves" (i.e., column F greater than 10) because the Blue division is in the attack. Therefore, the planning for wire/cable is not as critical as it is for the VHF multichannel backbone system.

15. Net 5 is of the same type as net 1.

16. Net 14 has the same characteristics as net 1. (This net and net 5 will be discussed with columns O-W of ARCLOG.)

ARC NUMBER [I]	A	K	L	M	N
		[ARCLOG(I,8) RIGHT HALF]	[ARCLOG(I,8) LEFT HALF]	[DAMT1]	[DAMT2]
	NET NUMBER	THE INDEX POSITION IN SETLOG OF THE TYPE RADIO EQUIPMENT USED ON THE ARC AT UNIT T1. USED IN DETERMINING THE TRANSMISSION RANGE OF THE ARC. ZERO FOR NON-RADIO ARCS.	THE SAME DATA AS ST1, BUT APPLICABLE TO T2.	THE DAMAGE CLASS CODE APPLICABLE TO THE ARC AT T1, EXTRACTED FROM DMGLOG.	THE DAMAGE CLASS CODE APPLICABLE TO THE ARC AT T2, EXTRACTED FROM DMGLOG.
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

CIN001-C

DATA BLOCK ARCLOG

TABLE IV-98, Supplemental Descriptions for Data Block ARCLOG (Columns O-R)

Number of Entries: As many entries per column as there are links. Links belonging to the same net should be entered together. Nets should be entered in numerically increasing order. Blue ARCLOG should be separate from Red ARCLOG. Each side may have no more than 890 arcs.

Entry Column	Description
O,P,Q	Experience with COMMEL indicates that these fields need not and should not be used. A crypto arc refers to an off-line device.
R	This field should be left blank.

ARC NUMBER [I]	A	O	P	Q	R
		[CPDGPN]	[ARCLOG(I,3)]	[ARCFLG(I,2)]	[ARCFLG(I,4)]
	NET NUMBER	THE INDEX POSITION IN CMPLOG TO DENOTE THAT THE EQUIPMENT IN THE ARC IS PATCHED THROUGH TO COMPLETE THE COMMUNICATIONS PATH.	THE INDEX POSITION IN PARLOG TO DENOTE THAT THE ARC IS A DUPLICATE COMMUNICATIONS PATH BUT NOT BY THE SAME ROUTE.	A "–" TO INDICATE THAT THE ARC IS A CRYPTO ARC.	COMSYS TAG
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

CIN001-D

DATA BLOCK ARCLOG

TABLE IV-99, Supplemental Descriptions for Data Block ARCLOG (Columns S-W)

Number of Entries: As many entries per column as there are links. Links belonging to the same net should be input together. Nets should be input in numerically increasing order. Blue ARCLOG should be separate from Red ARCLOG. Each side should have no more than 890 arcs.

Entry Column	Description
S, T	These are explained below.
U	Signal expertise during current model applications indicate that scheduled messengers are unnecessary. (Only special messengers are used.) Therefore, this field should be left blank.
V, W	These are explained below.

The example input forms illustrate the use of columns S, T, V, and W. The system shown in nets 5 and 14 uses a radio at battalion (unit 11 - field B) for command, but that radio is also used to monitor brigade (unit 4). If brigade calls, the battalion switches its receiver/transmitter to the brigade frequency after a short delay. This effect is modeled in nets 5 and 14 with units 11 through 15 representing battalions with battalion HQ at unit 4. (1st bde CP) Columns S, T, V, and W show the shared equipment at unit 11. If column V is flagged '1', the equipment at terminal 1 (column B) is busy and not immediately available. If column W is flagged, the shared equipment applies to terminal 2 (column C). This flagging is done on an arc-by-arc basis in applicable nets. Columns S and T need be considered only if the equipment is used in a net previously described in the ARCLOG list. (i.e., net 14 shares equipment at unit 11 with net 5) In such an instance, the net number of the previously described net (net 5 in the example) is given in column S or T (S for terminal 1 in the example) so that the second link (in net 14 of the example) will not be used (from unit 11 to unit 33, etc. in the example) when the equipment is busy in the first link (unit 4 to unit 11 in net 5). The first link would also not be used whenever the equipment is busy in the second link.

ARC NUMBER [I]	A NET NUMBER	S IF THE EQUIPMENT AT T1 IS ALSO USED IN A NET PREVIOUSLY DESCRIBED, THE NET NUMBER IS INDICATED SO THAT THE ARC WILL NOT BE USED WHEN THE EQUIPMENT IS BUSY IN THE FIRST ARC. THE FIRST ARC WOULD ALSO NOT BE USED WHENEVER THE EQUIPMENT IS BUSY IN THE SECOND ARC. [A]	T IF THE EQUIPMENT AT T2 IS ALSO USED IN A NET PREVIOUSLY DESCRIBED, THE NET NUMBER IS INDICATED SO THAT THE ARC WILL NOT BE USED WHEN THE EQUIPMENT IS BUSY IN THE FIRST ARC. THE FIRST ARC WOULD ALSO NOT BE USED WHENEVER THE EQUIPMENT IS BUSY IN THE SECOND ARC. [B]	U INDEX NUMBER TO A SPECIFIC MESSENGER ROUTE GROUPING, IF APPLICABLE. [C]	V FIGURE "1" IF THE EQUIPMENT IS USED AT T1 IN ANOTHER NET AND MAY BE BUSY AND NOT IMMEDIATELY AVAILABLE. [D]	W FIGURE "1" IF THE EQUIPMENT IS USED AT T2 IN ANOTHER NET AND MAY BE BUSY AND NOT IMMEDIATELY AVAILABLE. [E]
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

TABLE IV-100, Supplemental Descriptions for Data Block CHANELOG

Number of Entries: As many per column as there are nets defined in ARCLOG. There should be no more than 280 nets per force.* No net number should exceed 280. Inputs should be in increasing numerical order by net and there must be a non-zero entry for every net from 1 through that with the highest number.

Entry Column	Description
A	Cross-references with column A of ARCLOG.
B	Set to '-' for all radio nets so that calls are queued when a busy condition is found. A blank is customarily set for telephone systems so that the caller essentially 'hangs up and tries again' in a minute or two. In such a case, the call is said to be 're-cycled.'
C	The model allows four security classes, coded from 1 to 4, with '1' representing a clear (unclassified) state. The entry is this column is the maximum security class of messages that can be carried over the net. Messages with a security class higher than that of this net cannot go over this net. In current model usage, only security class '1' (unclassified) was used due to difficulty in assessing specific message security and in presenting the system flow of messages from being penalized by an improper mix of security classes.
D	Current applications of the model have treated the model/usage code as also embodying the electronic character (VHF, FM voice) of the net as well as net function. Mode usage codes from applied studies consist of those shown in Table IV-93. It is important that only the appropriate mode code be prefixed to the usage code. Thus, all voice usages must be prefixed only by 0 and all teletype usages must be prefixed by a 1. For example, 001 and 105 are allowable, but 101 and 005 are not.
E	Cross-references with the index column (A) of data block WIRELOG. If a net is not a wire net, a '0' is coded here. If the net is a wire net, the system

*For illustrative purposes, only 34 nets are shown.

	type (index) is entered, as defined in WIRELOG. In current model applications the entire VHF multi-channel system was tested as a single wire system because of programming problems relating to radio networks.
F	Scheduled messengers are not used in current model applications. This column contains the total number of circuits in the link.

1. Net 1 is an FM voice CMD/OPNS/INTEL radio net (column D = 003) with a single channel. Messages are queued when encountering a busy condition.

2. Net 2 is a RATT ADMIN/LOG net (column D = 106) using two circuits (column F = 2).

3. Net 3 is the same as net 2 except that it has only a single circuit (column F = 1).

4. Net 4 is a common user wire voice net (column D = 002). The wire flag (column E) is set to 1 (for wire system 1 in WIRELOG). Calls encountering a busy condition are recycled (column B = blank) and the net has 4 circuits (column F = 4).

5. Net 5 is a common user voice net (column D = 009) with 9 circuits. The other net characteristics are the same as net 4.

A	B	C	D	E	F
	[CHNLOG(I,1)]	[CHNLOG(I,2)]	[CHNLOG(I,3)]	[CHNLOG(I,4)]	[CHNLOG(I,5)]
	A "–" IS USED WHEN MESSAGES SHOULD QUEUE WHEN FINDING A BUSY CONDITION. THE COLUMN IS LEFT BLANK IF MESSAGES ENCOUNTERING BUSY CONDITIONS ARE TO BE RE-CYCLED FOR SUBSEQUENT ATTEMPTS TO USE THE CHANNEL.	A CODE NUMBER USED TO DESIGNATE THE MAXIMUM SECURITY CLASS OF MESSAGES THAT CAN BE CARRIED BY THIS CHANNEL.	A MODE-USAGE CODE NUMBER USED TO INDICATE THE MODE (VOICE OR WRITTEN) AND CLASS (COMMAND, ADMINISTRATIVE, LOGISTICAL, ETC.) OF THE TRAFFIC CARRIED BY THE CHANNEL.	THE INDEX POSITION IN WIRLOG OF DATA PERTAINING TO FIELD WIRE OR CABLE IF THIS CHANNEL IS CARRIED BY WIRE OR CABLE, OR THE INDEX POSITION IN RUTLOG IF THIS IS A MESSENGER CHANNEL. IF THE CHANNEL IS NEITHER MESSENGER OR WIRE, ZEROS ARE PLACED IN THIS FIELD.	THE NUMBER OF INDIVIDUAL CIRCUITS CONTAINED IN THE CHANNEL, UNLESS IT IS A MESSENGER CHANNEL, IN WHICH CASE, ZERO. THE ZEROS ALSO DISTINGUISH ENTRIES IN WIRE/ROUTE I FIELD AS RUTLOG INDICES RATHER THAN WIRLOG INDICES.
[NET]					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					

CHANNEL NUMBER

TABLE IV-101, Supplemental Descriptions for Data Block CONSTANTS

Number of Entries: One for each Blue entry, one for each Red entry.

Entry Column	Description
A	This value can be no larger than 390. Available computer 'core' storage constrains model expansion.
B	All model applications thus far have used the usage code '9' to designate common user.
C	Blue communications data blocks are entered together (using KPASS = 1) separately from Red.
D	Radios have nominal ranges (input in data block SETLOG). These may be extended by changing antennas (e.g., whip to RC-292) and/or improving location (e.g., higher ground for line of sight [LOS]). The radio will be considered inoperative due to extended range, if the distance to the other party exceeds RANGMX x nominal range.
E	At closer than RANGMN x nominal range, radios suffer no degradation of signal. Between RANGMN x nominal range and RANGMX x nominal range, a radio signal is degraded more and more with increasing range.
F	A special messenger may be dispatched if electronic means are out. At the average speed of a jeep, 30 km/hr, it would take 20 minutes to travel 10 km.
G	Reflects the decision and processing time involved in shifting to special messenger.

From the data form shown, the following are evident:

a. There can be at most 390 messages in process at any one time. This is the upper limit of the current model.

b. The common user usage code is '9' and this block is part of a Blue data set (KPASS = 1).

c. Radios are not degraded within the nominal range. Radio signals are degraded between the nominal range and 25 percent beyond nominal range, at which distance degradation due to extended range is total.

d. Special messenger dispatch requires a processing delay of 5 minutes and a special messenger travels (via jeep) at 30 km/hr (.5 km/min).

COMMUNICATIONS INPUT CONSTANTS

[IMESLM]

A THE MAXIMUM NUMBER OF MESSAGES THAT CAN BE IN THE MESSAGE LOG AT ANY TIME.

[KOMONU]

B THE MESSAGE USAGE CODE NUMBER DESIGNATED FOR COMMON USER EQUIPMENT.

[KPASS]

C INDICATES WHICH FORCE (BLUE OR RED) THE DATA DESCRIBES. "1" EQUALS BLUE; "2" EQUALS RED. (IMPORTANT ONLY IF KSAMPL = 2)

[RANGMX]

D RANGE MULTIPLIER TO ESTABLISH MAXIMUM RANGE OF A RADIO SET FROM THE NOMINAL RANGE.

[RANGMN]

E RANGE MULTIPLIER TO ESTABLISH A RANGE OF A RADIO SET FROM THE NOMINAL RANGE OF WHICH THERE WILL BE NO DEGRADATION OF THE SIGNAL.

[TRVCTM]

F A DIVISOR INTO THE DISTANCE IN KILOMETERS BETWEEN TWO UNITS TO GIVE THE TRAVEL TIME OF A SPECIAL MESSENGER IN MINUTES.

[TSPECL]

G A DELAY IN MINUTES IMPOSED ON MESSAGES THAT ARE SENT BY SPECIAL MESSENGER.

CIN003

DATA BLOCK:
CONSTANTS

TABLE IV-102, Supplemental Description for Data Block DAMAGLOG (Columns A-C)

Number of Entries: As many per column as there are different equipment complex types, but no more than 30 equipment types may be entered in this data block.

Entry Column	Description
Index (Damage Class)	The indexing of lines (i.e., the damage class number) cross-references with columns M and N of data block ARCLOG.
A	Code '1' for parallel arrangement of components, '0' for series. Damage from combat fire is computed differently for the two configurations.
B	If an equipment complex is damaged or fails, this entry specifies the average time required to restore the entire complex to service. The specific simulated repair time is a value randomly drawn between .5 x (column B) and 1.5 x (column B).
C	To convert mean-time (hours) between failure (MTBF) to 'failure per five minutes' (column C), which is entered here, do the following: failures/5 min = 1/(12 x MTBF [hr])

A	B	C
[DMGLOG (I, 9)]	[RPARLG (I, 1)]	[RPARLG(I,2)]
THE NUMBER "1" IF THE INDIVIDUAL EQUIPMENTS COMPRISING THE EQUIPMENT COMPLEX ARE ARRANGED IN A PARALLEL CONFIGURATION (SO THAT ALL EQUIPMENTS MUST BE INOPERATIVE IN ORDER TO RENDER THE COMPLEX INOPERATIVE), OR THE NUMBER "0" IF THE EQUIPMENTS ARE ARRANGED IN SERIES (SO THAT IF ANY ONE OF THE EQUIPMENTS IS INOPERATIVE, THE ENTIRE COMPLEX WILL BE INOPERATIVE).	THE AVERAGE TIME IN HUNDREDTHS OF MINUTES REQUIRED TO RESTORE THE EQUIPMENT COMPLEX TO SERVICE AFTER DAMAGE OR FAILURE. RESTORATION TO SERVICE IS PRESUMED TO BE THROUGH EITHER REPAIR OR REPLACEMENT.	THE ANTICIPATED AVERAGE FAILURE RATE OF THE EQUIPMENT COMPLEX PER 5 MINUTE PERIOD.

DAMAGE CLASS CODE
[I]

DAMAGE CLASS CODE [I]	A	B	C
1			.
2			.
3			.
4			.
5			.
6			.
7			.
8			.
9			.
10			.
11			.
12			.
13			.
14			.
15			.
16			.
17			.
18			.
19			.
20			.
21			.
22			.
23			.
24			.
25			.
26			.
27			.
28			.
29			.
30			.

TABLE IV-103, Supplemental Descriptions for Data Block DAMAGLOG (Columns D-K)

Number of Entries: As many per column as there are different equipment complex types, but no more than 30 equipment types may be input in this data block.

Entry Column	Description
D-K	The column numbers represent equipment component types with type (column) 1 components currently used to represent the smallest, simplest and least vulnerable, while type (column) 8 components are largest, most complex and most vulnerable. These 'component' types must necessarily be aggregates of 'real world' components. Enter in each column the number of components in the equipment type corresponding to that line. Component vulnerabilities are quantified in data block VULNRLOG (discussed below). Current applications of COMMEL have utilized only four equipment damage classes, viz: damage class 1 = single channel radio damage class 2 = RATT damage class 3 = VHF - multichannel damage class 4 = wire/switchboard

The example forms define four damage classes, possessing the following characteristics:

1. Damage Class 1 - The 'single channel radio' equipment of this class has a mean time between failure (MTBF) of 830 hours (830 = 1/[12 x .0001]). An average of 30 minutes is required for repair. The equipment has exactly 3 components of (component type 1) arranged in a parallel configuration (column A = 1 in DAMAGLOG).

2. Damage Class 2 - The RATT equipment of this class has an MTBF of 280 hours and a mean time to repair (MTTR) of 50 minutes. The equipment has 5 components, three of type 1 and two of type 2. These components are arranged in a series configuration (column A = 0).

3. Damage Class 3 - The VHF multichannel equipment of this class has an MTBF of 210 hours and a MTTR of 60 minutes. The equipment has two components of type 8 which are arranged in series.

4. Damage Class 4 - The wire/switchboard equipment of this class has a MTBF of 105 hours and a MTTR of 200 minutes. The equipment has eight components arranged in series. Four of these are type 6 and four are of type 8.

D E F G H I J K

[DMGLOG (I, 1)–(I, 8)]

THE NUMBER OF INDIVIDUAL COMPONENTS OF THE COMPLEX WHICH ARE DAMAGE CLASS.

DAMAGE CLASS CODE

THE INDEX OF THE LIST, BEING THE NUMBER OF "DAMAGE CLASSES" OF EQUIPMENT BEING CONSIDERED.

[I]

	1	2	3	4	5	6	7	8
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DATA BLOCK:
DAMAGLOG

TABLE IV-104, Supplemental Descriptions for Data Block DELAYLOG

Number of Entries: As many per column as there are arc types that go out when associated terminals are moving, but no more than 10 such types. The arc type (index on side of block) cross-references with column F of data block ARCLOG and should be less than 10.

Entry Column	Description
A	This entry should be restricted to 10 minutes or less, since it should be less than the displacement delay input in tactical block BA. The model cannot alter communications states retroactively after a unit begins to move.
B	If a unit begins moving again before its communications are up, a new and later up-time is computed for all affected links. Experience with current model applications indicates that the unit displacement communications outage time for a 'real world' system should be split artificially into columns A and B of DELAYLOG. The sum of columns A and B should equal the 'real world' time.

Refer to Table IV-92 in the ARCLOG discussion. With that Table as a key, the following total (column A + column B) outage times apply to the arc types of the examples.

Arc Type	Outage Duration (min)
1 - common user VHF voice	480
2 - sole user VHF voice	320
3 - common user VHF TTY	360
4 - common user cable voice	390
6 - common user cable TTY	390

ARC TYPE

INDEX OF THE LIST, BEING THE CONSECUTIVE ORDER OF THOSE ARC TYPES WHICH ARE TO BE TAGGED "OUT" WHEN EITHER END UNIT IS DISPLACING BY ECHELONS.

[I]

A

[DLYLOG (I, 1)]

AVERAGE TIME IN MINUTES PRIOR TO THE MOVEMENT OF THE UNIT WHEN THE ARC TYPE "I" WILL BE REMOVED FROM SERVICE.

B

[DLYLOG (I, 2)]

AVERAGE TIME IN MINUTES AFTER THE UNIT ARRIVES AT ITS NEW LOCATION WHEN SERVICE WILL BE RESTORED ON ARC TYPE "I".

[I]	A	B
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

TABLE IV-105, Supplemental Descriptions for Data Block NA (Tactical)

Number of Entries: There are exactly 50 entries per column.* These describe up to 50 tactically essential message types. Zeros are entered for fields of unused message types.

Entry Column	Description
Index	Message type. A key is displayed in Table IV-94. These message codes and their meanings are fixed by the programming.
A	Cross-references with column C of CHANNELOG.
B	Characteristics of the precedence classes are defined in data block PRELOG. Only precedence classes 3 through 6 are used.
C	Basic message length is modified by column G of data block ARCLOG.
D	Cross-references with column D of data block CHANELOG. The key is in Table IV-93.
E	If a message is not delivered by message start plus deadline, then it either is changed to other means or is failed. Column E applies only to tactically essential messages.
F	All pairs of units may be served by special messenger. Time of delivery is dependent on length of route and messenger speed. The latter is entered in data block CONSTANTS.
G	Under current applications, this flag is not used.

The first two message types of the example have the following characteristics:

1. Message type 1 is a coordination message between companies. It is unclassified (column A = 1) and has 'immediate' precedence

*For illustrative purposes, only 15 message types are shown on the form.

(column B = 5). The basic message length is one minute (column C = 1) and the message will be carried over a FM-voice net (column D = 003). The message is allowed 5 minutes (column E) from generation and delivery. If the message is undelivered after 5 minutes, it will be delivered by special messenger (column F = 1).

2. Message type 2 is an intelligence report from company to battalion. Its characteristics are similar to message type 1, except that message precedence is 'routine' (column B = 3), basic message length is 1.5 minutes (column C), and 10 minutes are allowed for delivery (column E).

MESSAGE TYPE [I] — DLINE – ALL EXPLICIT MESSAGES ARE GROUPED BY TYPE. EACH TYPE IS ASSIGNED A SIMULATION NUMBER.	A [MESGES(I,5)] EACH MESSAGE TYPE IS CLASSIFIED FOR TRANSMISSION SECURITY.	B [MESGES(I,6)] EACH MESSAGE TYPE IS CLASSIFIED FOR TRANSMISSION PRIORITY.	C [MESGEL] EACH TYPE MESSAGE IS ASSIGNED A TRANSMISSION LENGTH. THIS IS EXPRESSED IN MINUTES AND REPRESENTS THE AVERAGE TIME A MESSAGE OF THIS TYPE IS ON THE AIR OR WIRE.	D [MESGES(I,4)] INDICATES THE COMMUNICATIONS MEANS AND THE NET USED TO TRANSMIT MESSAGES OF THIS TYPE.	E [MESGES(I,1)] FOR EACH TYPE MESSAGE THERE IS A DEADLINE. WHEN A MESSAGE IS NOT UNDER TRANSMISSION BY DEADLINE TIME, A DECISION IS MADE TO (1) FAIL IT, (2) CHANGE TO OTHER MEANS. FLAGS 1 AND 2 DETERMINE DISPOSITION OF A FAILED MESSAGE.	F [FLAG1] IDENTIFIES MSGS THAT GO BY SPECIAL MESSENGER IF NOT DELIVERED BY ELECTRIC MEANS WHEN DEADLINE IS REACHED. (0 = MSG IS DELETED; 1 = SPECIAL MESSENGER IS USED.)	G [FLAG2] IDENTIFIES MESSAGES THAT ARE TO BE CONVERTED FROM WRITTEN TO NON-WRITTEN, OR FROM NON-WRITTEN TO WRITTEN, IF NO ROUTE IS AVAILABLE FOR THE ORIGINAL MODE. (0 = NOT CONVERTED; 1 = CONVERTED.)
1			.		.		
2			.		.		
3			.		.		
4			.		.		
5			.		.		
6			.		.		
7			.		.		
8			.		.		
9			.		.		
10			.		.		
11			.		.		
12			.		.		
13			.		.		
14			.		.		
15			.		.		

TIN035

DATA BLOCK NA

TABLE IV-106, Supplemental Descriptions for Data Block PRELOG

Number of Entries: Exactly four per column are entered.

Entry Column	Description
A	Precedence classes 1 and 2 should not be used. The lowest precedence should be class 3 and the highest class 6. The application of PRELOG data is discussed in the comments on data block UTECHFAC.

Refer to the comments on data block UTECHFAC. These explain how the data of the PRELOG block are used to compute handling delays at message centers.

A

[PRELOG]

AVERAGE TIME IN MINUTES REQUIRED TO DELIVER WRITTEN MESSAGES OF THE INDEXED PRECEDENCE CLASS FROM THE ORIGINATOR TO A MESSAGE CENTER.

MESSAGE PRECEDENCE [I]

1

2

3

4

5

6

TABLE IV-107, Supplemental Descriptions for Data Block ROUTELOG

Number of Entries: No more than 15 values may be entered in each column.

Entry Column	Description
A, B	If used these columns contain the end points of a scheduled messenger link. An entry in column B of a line must be the same as the column A entry of the immediately succeeding line.
C	This is the game time at which scheduled messenger service begins.
D	This entry is the travel time for a scheduled messenger traversing the specified link.

Current model applications do not utilize scheduled messengers. Special messengers have been found to be sufficient. If scheduled messengers were used, data block ROUTELOG would be used to define messenger structure. Its use, however, is cumbersome and restricted and is not recommended.

MESSENGER ROUTE NUMBER [I]

[I]	A	B	C	D
	[A]	[B]	[TYMLOG(I,1)]	[TYMLOG(I,2)]
	THE FIRST END UNIT OF A LEG OF A MESSENGER ROUTE.	THE SECOND END UNIT OF THE LEG OF A MESSENGER ROUTE.	FIRST START TIME IN THE GAME.	COMPLETION TIME WHEN MESSENGER ARRIVES AT THE SECOND END UNIT.
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

CIN007

DATA BLOCK:
ROUTELOG

TABLE IV-108, Supplemental Descriptions for Data Block SETLOG

Number of Entries: As many per column as there are radio set types, but no more than 45.

Entry Column	Description
A	Cross-references with the entries of SETYPLOG and with columns K and L of data block ARCLOG.
B	It is assumed that the assigned range applies to a pair of sets regardless of which set is the transmitter or the receiver.
C	This entry is an average nominal operating range (in km). It is not necessarily the range at which maximum transmission efficiency results. The latter is equal to RANGMN x column C, where RANGMN is entry E of data block CONSTANTS. The range at which transmission is totally degraded is equal to RANGMX x column C, where RANGMX is column D of the CONSTANTS data block.

Radio set type 1, when talking to set type 1, has a nominal range of 32 km. From the CONSTANTS data block example, note that RANGMN = 1.0 and RANGMX = 1.25. Therefore, reception between two radios of type 1 is perfect at ranges less than 1.0 x 32 = 32 km, and is gradually degraded from this range out to a maximum range of 1.25 x 32 = 40 km, beyond which no communication is possible. The remainder of the example may be summarized as follows:

Radio Pair Set Type	Nominal Range	Perfect Reception To	No Reception Beyond
2	80 km	80 km	100 km
3	80 km	80 km	100 km
4	40 km	40 km	50 km
5	22 km	22 km	28 km

SET TYPE

THE INDEX OF THE LIST, BEING THE CONSECUTIVE ORDER OF THE CARDS.

[I]

	A	B	C
	[SETLOG (I, 1)]	[SETLOG (I, 2)]	[RADRNG]
	A CODE NUMBER ASSIGNED TO A GIVEN RADIO SET TYPE AND APPLICABLE TO THE FIRST OF A PAIR OF RADIO SETS CAPABLE OF INTER-COMMUNICATING.	A SIMILAR CODE NUMBER, BUT APPLICABLE TO THE SECOND OF THE PAIR OF RADIO SETS.	THE OPERATING RANGE IN KILOMETERS OF A PAIR OF RADIO SETS OF THE TYPES INDICATED.
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

NOTE: THE NUMBERING OF RADIO SET "TYPES" IS ARBITRARY WITH ALL SETS USING THE SAME BASIC TYPE TRANSMITTER AND RECEIVER BEING GIVEN THE SAME TYPE NUMBER (E. G. RT-524 OF THE AN/VRC-46, 47 AND 49 RADIOS ARE GIVEN THE SAME TYPE NUMBER SINCE THEIR RANGE CHARACTERISTICS ARE IDENTICAL). A GIVEN BASIC SET IS GIVEN DIFFERENT SET TYPE NUMBERS, HOWEVER, TO REFLECT DIFFERENCES IN MODES, AS STATIONARY OR MOVING, OR DIFFERENCES IN ANTENNA AS WHIP OR RC-292.

	A (CONT'D)	B (CONT'D)	C (CONT'D)
	[SETLOG (I,1)]	[SETLOG (I,2)]	[RADRNG]
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			

CIN008

DATA BLOCK:
SETLOG

TABLE IV-109, Supplemental Descriptions for Data Block SETYPLOG

Number of Entries. No more than 25 entries per column are allowed:

Entry Column	Description
A,B,C,D	These entries cross-reference with the B and C columns of data block SETLOG. The intent of SETYPLOG is to enable simulation of an antenna or power change when a radio is moving or about to move by treating the diminished transmission capability as another set type. During current COMMEL applications, signal expertise has deemed the purpose of this data block to be irrelevant. Therefore, all applications have used equal entries on each line.

RADIO SET TYPE NUMBER

THE INDEX OF THE LIST, BEING THE CODE NUMBER ASSIGNED TO THE RAIDO SET FOR THE PARTICULAR ARC.

[I]

	A	B	C	D
	[STYPLG (I, 1)]	[STYPLG (I, 2)]	[STYPLG (I, 3)]	[STYPLG (I, 4)]
	THE SET TYPE NUMBER FOR THE RADIO SET WHEN THE UNIT IS NOT MOVING.	THE SET TYPE NUMBER FOR THE RADIO SET WHEN THE UNIT IS PREPARING TO MOVE.	THE SET TYPE NUMBER FOR THE RADIO SET WHEN THE UNIT IS MOVING.	THE SET TYPE NUMBER FOR THE RADIO SET WHEN THE UNIT IS EMPLACING AFTER A MOVE.
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				

CIN009

DATA BLOCK:
SETYPLOG

TABLE IV-110, Supplemental Descriptions for Data Block STA (Columns A-E)

Number of Entries: As many per column as there are STM (subtactical message) nets. There can be no more than 75 STM nets.

Entry Column	Description
A	STM nets consist primarily of ADMIN/LOG traffic flowing over the multichannel backbone division communications system. The three data blocks for this background traffic, called 'subtactical message' (STM) traffic, are STA, STB and STC. The links used by STM traffic are those of ARCLOG which connect the units designated in STA and have the mode/usage codes designated by field I of STA.
B	Net type code which cross-references with column A of STC. The net type is used by STC to distribute STM net messages according to sender, receiver, security, and precedence. The values in column B need not match those of column A, nor need they be distinct.
C	In current model applications, this value has been set equal to that of column K.
D	The user must determine the highest echelon of command at which the net functions and should assign the appropriate code from:
E	Set equal to 0.

Echelon codes for column D:

Echelon	Code
Division	0
Brigade	1
Battalion	2

A	B	C	D	E
NET NUMBER	NET TYPE	THE AVERAGE NUMBER OF MESSAGES THAT WILL BE GENERATED FOR THE NET EVERY 60 MINUTES OF GAME SIMULATION.	DESIGNATES THE HIGHEST LEVEL OF COMMAND OPERATING IN THE NET.	IDENTIFIES THE DIVISIONS WITHIN THE NET IF MORE THAN ONE DIVISION IS SIMULATED.

STM001-A

DATA BLOCK STA

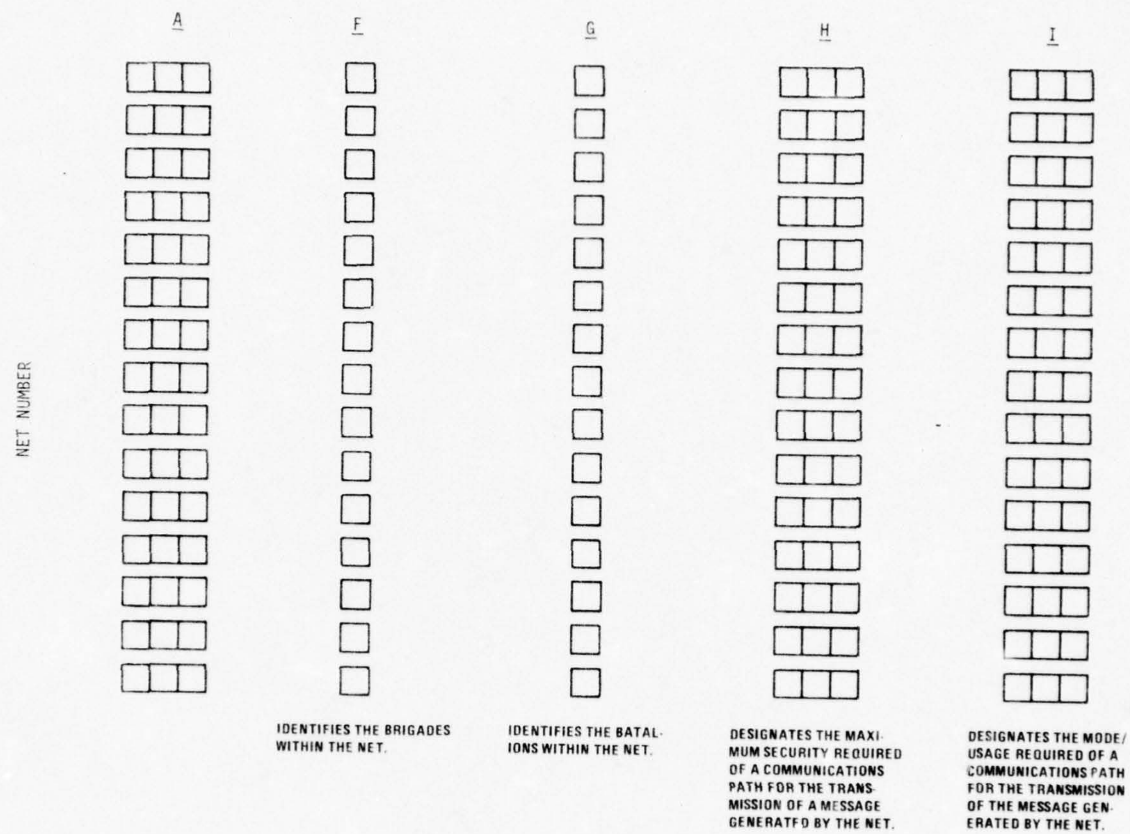
TABLE IV-111, Supplemental Descriptions for Data Block STA (Columns F-I)

Number of Entries: As many per column as there are STM (sub-tactical message) nets. There can be no more than 75 STM nets.

Entry Column	Description
F	Indicate the brigades upon which messages generated by the net impact tactically. Assign brigade codes as follows, where 'brigade number' is related to tactical data block PA:

Brigade Number	Code
No bde	0
Bde 1	1
Bde 2	2
Bde 3	3
Bde 1 and 2	4
Bde 1 and 3	5
Bde 2 and 3	6
Bde 1, 2 and 3	7

Entry Column	Description
H	This column cross-references with the security class (field C) of CHANELOG. Only links (from ARCLOG) with security class at least equal to this value will be considered.
I	This column cross-references with Table IV-93 and the mode/usage (field D) of CHANELOG. Only links from ARCLOG with matching mode/usage will be considered.



STM001-B

DATA BLOCK STA

TABLE IV-112, Supplemental Descriptions for Data Block STA (Columns J-L)

Number of Entries: As many per column as there are STM (subtactical message) nets. There can be no more than 75 STM nets.

Entry Column	Description
J	Average time (min) required for transmission after connect.
K	Current model applications have set this column equal to column C. Generation rates are determined in light of the units in the net (assigned in STB) and the STM net characteristics.
L	The larger a weight, the more important that STM net is to the tactical operations. Penalties are assigned to units when messages fail. These weights should be set at values no greater than 5.

NET NUMBER

A

J

K

L

AN AVERAGE TIME IN MINUTES REQUIRED FOR THE "ON THE AIR" TRANSMISSION OF THE MESSAGE GENERATED BY THE NET.

THE MAXIMUM NUMBER OF MESSAGES THAT MAY BE GENERATED BY THE NET EVERY 60 MINUTES OF GAMES SIMULATION.

A NUMERICAL VALUE ASSIGNED TO THE NET TO INDICATE THE RELATIVE IMPORTANCE OF THE NET TO THE TACTICAL OPERATIONS. THE MESSAGE WEIGHT IS USED AS A FACTOR IN DETERMINING THE PERFORMANCE OF THE COMMUNICATIONS SYSTEM AND ASSESSING A TACTICAL PENALTY TO THE TACTICAL UNITS WHEN THE MESSAGE GENERATED IS LOST OR DELAYED.

DATA BLOCK STA

STM001-C

TABLE IV-113, Supplemental Descriptions for Data Block STB

Number of Entries: For each column and each net of STMUNIT, there are as many entries as there are units in each net. There should be a total of no more than 310 entries per column.

Entry Column	Description
A	Cross-references with the 'net number' column of STA.
B	These values cross-reference with the unit numbers of tactical data block AA and columns B and C of ARCLOG.
C	Cross-references with columns B of STC. For each unit of a STM net, this designator points to the data in STC which defines the distribution of messages in the net. Only values 1 through 6 are permitted in this column.

The individual nets of the example are shown as possessing the following characteristics:

1. Net 1 consists of unit 1 (div main CP) and unit 2 (div spt cmd). Column C will be discussed in the STC commentary.

2. Net 2 consists of unit 6 (3rd bde CP) and unit 120 (3rd sig cen).

3. Net 3 consists of unit 1 and unit 3 (div arty CP).

4. Under current applications, only single links are used for each STM net.

A	B	C
NET NUMBER	IDENTIFIES THE UNITS OPERATING IN THE SPECIFIC NET.	A CONTROL NUMBER USED TO DETERMINE THE SENDER AND ADDRESSEE PERCENTAGE OF NET PARTICPATION FROM STMDATA FOR EACH UNIT IN THE NET.

TABLE IV-114, Supplemental Descriptions for Data Block STC (Columns A-D)

Number of Entries: For each column, assign up to 21 net types. For each net type, generate six levels per net type.

Entry Column	Description
A	Net type. It cross-references with column B of STA.
B	Level code. It cross-references with column C of STB.
C, D	Allocate percent of net messages sent and received by a unit in a STM net of the type designated by column A, with the specified level code. Column C entries should sum to 100 within a net, as should those of column D.

A	B	C	D
NET TYPE	LEVEL	PERCENT SENDER	PERCENT RECEIVER

A PERCENTAGE FIGURE USED IN DETERMINING THE AVERAGE NUMBER OF MESSAGES TO BE GENERATED AND RECEIVED BY AN INDIVIDUAL UNIT WITHIN THE DESIGNATED STM NET.

TABLE IV-115, Supplemental Descriptions for Data Block STC (Columns E-L)

Number of Entries: For each column, assign up to 21 net types. For each net type, generate six levels per net type.

Entry Column	Description
E, F, G, H	Allocate security class among messages generated by a unit with the specified level code (column B). The largest entry is 99. The sum of columns E through H should be 100.
I, J, K, L	Allocates precedence class among messages generated by a unit with the specified level code. The sum of columns I through L should be 100.

The first two nets of the example are defined, through the displayed forms, as having the following characteristics:

1. Referring to block STA, net 1 is of net type 1. Using STB and STC, note that in net 1, unit 1 (with 'level code' = 1) will be sender for 45 percent of net traffic and receiver for 55 percent. Unit 2 (with 'level code' = 2) will be sender for 55 percent and receiver for 45 percent. Also, 99 percent of all net traffic will be of security class 1 (unclassified) and one percent will be of class 2. For all net traffic, 86 percent will be of the lowest precedence class (class 3) and 14 percent will be class 4.

2. Net number 2 of STA is of net type 2. Using STB and STC, note that in this net unit 6 and unit 120 are each sender and receiver for 50 percent of net traffic. Net security distribution is the same as for net 1. For all net traffic, 82 percent will be of the lowest precedence and 18 percent will be of the nest higher class.

A	B	E	F	G	H
		PERCENT IN SECURITY CLASS			
NET TYPE	LEVEL	1	2	3	4

A PERCENTAGE FIGURE USED IN DETERMINING THE NUMBER OF MESSAGES THAT WILL BE GENERATED BY SECURITY CLASS FOR A PARTICULAR STM NET.

A	B	I	J	K	L
		PERCENT IN PREC CLASS			
NET TYPE	LEVEL	3	4	5	6

A PERCENTAGE FIGURE USED IN DETERMINING THE NUMBER OF MESSAGES THAT WILL BE GENERATED BY PRECEDENCE CLASS FOR A PARTICULAR STM NET.

TABLE IV-116, Supplemental Descriptions for Data Block TYPELOG

Number of Entries: No more than 20 entries per column can be made for each force.

Entry Column	Description
A, B	These entries cross-reference with column F of data block ARCLOG. Every paired combination of connectable arc types should be accounted for. Only those arc types that are paired here can be connected.
C	Because of program restrictions, at most 6 arcs can be connected to form one message path. In addition, the sum of the 'connect costs' (this entry) for a message path must be less than .97. Current model applications allow the maximum number of message connects by keeping all 'connect costs' at values of .15 or lower.

The first four combinations, translating from Table IV-92, are:

Arc Type 1	Arc Type 2	Connect Cost	Connect Time
C/U* VHF voice (out when moving)	Same	.15	7 sec
C/U VHF voice (out when moving)	Wire link	.15	7 sec
C/U VHF voice (out when moving)	C/U VHF voice (not out while moving)	.15	7 sec
Wire link	C/U VHF voice (out when displacing)	.15	7 sec

*C/U: Common User

	A	B	C	D
	[TYPLOG(I,1)]	[TYPLOG(I,2)]	[CONCST]	[CONDLY]
	THE ARC TYPE OF THE FIRST OF A PAIR OF ARC TYPES WHICH CAN BE CONNECTED.	THE ARC TYPE OF THE SECOND ARC TYPE OF THE PAIR.	A NUMBER BETWEEN .01 AND .99 REPRESENTING THE "COST" OF CONNECTING AN ARC OF TYP 1 TO TYP 2. THESE VALUES ARE USED BY ROUTING, TOGETHER WITH THE INITIAL COSTS GIVEN IN UTARCLOG, IN SEEKING THE LOWEST VALUED PATH BETWEEN TWO GIVEN UNITS.	AVERAGE TIME IN SECONDS REQUIRED TO CONNECT AN ARC OF TYP 1 TO TYP 2.
ARC TYPE				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

TABLE IV-117, Supplemental Descriptions for Data Block USAGELOG

Number of Entries: No more than 31 per column are allowed.

Entry Column	Description
Index (Usage Code)	The values of usage code should cross-reference with those used in data block CHANELOG, (see Table IV-93) and with the usage column of tactical data block NA.
A, B, C	Enter alternate usage codes in order of preference.
D	If common-user circuits are an alternate usage, a '9' is placed here, otherwise '0'. This path will be simultaneously checked before going to A if there is a '9' here.

Referring to Table IV-93, the example translates as:

Index Usage	1st Alt Usage	2nd Alt Usage	3rd Alt Usage	Common User
VHF S/U voice	Wire C/U voice	FM voice cmd		Yes
Wire C/U voice	FM voice cmd			Yes
FM voice cmd	SSB voice cmd			Yes
SSB voice cmd	FM voice cmd			Yes
RATT opns				No
RATT admin	Wire C/U TTY			No
Wire C/U TTY	RATT admin			No
VHF C/U voice	Wire C/U voice	FM voice cmd	SSB voice cmd	No

MESSAGE USAGE CODE

THE INDEX OF THE LIST, BEING THE MESSAGE USAGE PORTION OF THE MODE-USAGE CODE NUMBER.

[I]

	A	B	C	D
	[USGLOG(I,1)]	[USGLOG(I,2)]	[USGLOG(I,3)]	[USGLOG(I,4)]
	THE FIRST ALTERNATE USAGE TO BE TRIED IF A ROUTE OF THE ORIGNIAL USAGE (I) CANNOT BE FOUND.	THE SECOND ALTERNATE USAGE TO BE TRIED.	THE THIRD ALTERNATE USAGE TO BE TRIED.	IF COMMON-USER CIRCUITS ARE AN ALTERNATE USAGE FOR I, 9 IS PLACED IN THIS FIELD. IF NOT, ZERO IS PLACED IN THIS FIELD
1				
2				
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7				
8				
9				
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11				
12				
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29				
30				
31				

CIN011

DATA BLOCK: USAGELOG

TABLE IV-118, Supplemental Descriptions for Data Block UTECHFAC

Number of Entries: As many per column as there are units in the combined forces, but no more than 257.

Entry Column	Description
A	This entry, for each unit, is a multiplier used in generating message delays at each echelon due to such factors as handling time at message centers and staff proximity to message delivery terminals. Values are assigned so that a division staff will get a message later than a battalion staff. The specific processing delay for a message is equal to (field A) x (message precedence delay), where the latter is assigned through data block PRELOG.

Assume, from the troop list, that: Div Main - unit 1, 1st bde CP = unit 4, 1st bn of 1st bde = unit 11. Also assume that precedence delay (from data block PRELOG) is 1.3 for messages of lowest precedence (class 3) and is 1.0 for messages of highest precedence (class 6). Then, the handling delays for messages of precedence classes 3 and 6 are as follows:

Msg Prec	Unit	Msg Handling Delay
3	Div main (#1)	1.3 x 2 = 2.6 min
6	Div main (#1)	1.0 x 2 = 2.0 min
3	1st bde (#4)	1.3 x 1.5 = 1.95 min
6	1st bde (#4)	1.0 x 1.5 = 1.50 min
3	1st bn/1st bde (#11)	1.3 x 1.0 = 1.30 min
6	1st bn/1st bde (#11)	1.0 x 1.0 = 1.00 min

A

[UTEKFK]

A NUMBER ASSIGNED FOR USE AS A MULTIPLIER IN DETERMINING THE SENDER/RECEIVER MESSAGE DISTRIBUTION DELAYS.

UNIT NUMBER

THE UNIT NUMBER ACCORDING TO THE TROOP LIST.

[I]

1	34	66	98	130	162	194	226
2	35	67	99	131	163	195	227
3	36	68	100	132	164	196	228
4	37	69	101	133	165	197	229
5	38	70	102	134	166	198	230
6	39	71	103	135	167	199	231
7	40	72	104	136	168	200	232
8	41	73	105	137	169	201	233
9	42	74	106	138	170	202	234
10	43	75	107	139	171	203	235
11	44	76	108	140	172	204	236
12	45	77	109	141	173	205	237
13	46	78	110	142	174	206	238
14	47	79	111	143	175	207	239
15	48	80	112	144	176	208	240
16	49	81	113	145	177	209	241
17	50	82	114	146	178	210	242
18	51	83	115	147	179	211	243
19	52	84	116	148	180	212	244
20	53	85	117	149	181	213	245
21	54	86	118	150	182	214	246
22	55	87	119	151	183	215	247
23	56	88	120	152	184	216	248
24	57	89	121	153	185	217	249
25	58	90	122	154	186	218	250
26	59	91	123	155	187	219	251
27	60	92	124	156	188	220	252
28	61	93	125	157	189	221	253
29	62	94	126	158	190	222	254
30	63	95	127	159	191	223	255
31	64	96	128	160	192	224	256
32	65	97	129	161	193	225	257
33							

CIN012

DATA BLOCK: UTECHFAC

TABLE IV-119, Supplemental Descriptions for Data Block VULNRLOG

Number of Entries: One value per column for each of 8 component types.

Entry Column	Description
A	The value entered here is a 'vulnerable area' for each component type referred to in DAMAGLOG. These 'vulnerable areas' are parameters used for computing battle damage to equipments (see documentation). In general, the more vulnerable a component, the greater its vulnerable area. Experience with COMMEL has shown that the entries in DAMAGLOG and VULNRLOG should be such that, for each damage class of equipment, the sum of (the product of the number of components and the vulnerable area of the component), when summed over all eight component types, should be less than 50.

A

[VULNLG]

NUMBER OF MAN-UNITS USED AS AN EQUIVALENT VALUE FOR THIS EQUIPMENT CLASS. ONE MAN-UNIT EQUALS 10 SQUARE FEET. THUS, THE VULNERABLE AREA OF TYPICAL PIECES OF EQUIPMENT IS COMPUTED WHEN VIEWED FROM AN OBLIQUE AND CONVERTED TO MAN-UNITS.

DAMAGE TYPE

INDEX OF THE LIST, BEING THE NUMBER OF DAMAGE CLASSES BEING USED.

[I]

1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

TABLE IV-120, Supplemental Descriptions for Data Block WIRELOG

Number of Entries: As many per column as there are different wire systems. There is a limit of five different wire systems per force. The index column cross-references with column E of CHANELOG.

Entry Column	Description
A	One grid square is currently equal to one kilometer. Thus, this entry is the failure rate per minute for each kilometer of wire.
B, C	The simulated repair time will be a randomly chosen number with a value between column B and column C.

The system shown consists of a wire such that each linear kilometer has an MBTF of 42 hours (reflected in the .00040 fails/min/km in column A). Between 30 and 90 minutes are required to repair a failed wire.

WIRE NUMBER

THE INDEX OF THE LIST, BEING A CONSECUTIVE NUMBER FOR EACH DATA GROUP PERTAINING TO ONE WIRE LINE OR CABLE.

[I]

	A	B	C
	[WIRLOG (I, 1)]	[WIRLOG (I, 2)]	[WIRLOG (I, 3)]
	THE ANTICIPATED AVERAGE FAILURE RATE OF THE WIRE LINE OR CABLE PER GRID SQUARE PER MINUTE EXPRESSED AS A FIVE PLACE DECIMAL FRACTION.	THE MINIMUM NUMBER OF MINUTES REQUIRED TO RESTORE SERVICE ON THE WIRE LINE OR CABLE AFTER FAILURE.	THE MAXIMUM NUMBER OF MINUTES REQUIRED TO RESTORE SERVICE ON THE WIRE LINE OR CABLE AFTER FAILURE.
1	. ☐☐☐☐☐	☐☐	☐☐
2	. ☐☐☐☐☐	☐☐	☐☐
3	. ☐☐☐☐☐	☐☐	☐☐
4	. ☐☐☐☐☐	☐☐	☐☐
5	. ☐☐☐☐☐	☐☐	☐☐

COMMEL II USER'S MANUAL

CHAPTER V
COMPUTER INPUT CARD FORMS

1. General

a. Once the input data has been entered on the Input Forms described in the preceeding chapter, the data must then be transcribed onto Input Cards. It is from the latter that the data are entered into the computer. This chapter describes how the data are to be transcribed from the Input Forms to the Input Cards.

b. The remainder of this chapter consists of a series of pages that describe in tabular form the transcription process. Each page is titled with a firm identification that corresponds to one of the Data Blocks. For example, the first page is entitled "Data Block CC" and corresponds to items described in Tables IV-34 to IV-40. The left most column of each page of the series contains a description of the card columns affected on the Input Card. Using the above example for Data Block CC, note that this column contains items "Column 1-8," "Column 10-17," and so forth.

c. The second column contains the Input Form identification from which the variable to be entered into the columns is derived. For example, the data to be entered into Line 1: Column 1-8 of Data Block CC is derived from Input Form TIN009-A. The data to be entered into Column 10-17 of Data Block CC is also derived from Input Form TIN009-A. The data to be entered into Line 2: Column 1-8 of Data Block CC is derived from Input Form TIN009-B.

d. The third column of these pages contains a further description of the variable to be entered onto the Input Card. This third column corresponds to the variable identified upon the Input Form specified in the second column. Using the same example, data to be entered into Column 1-8 of Line 1 for Data Block CC is described as FRMVCUT (1, 1) in Input Form TIN009-A. Seven more items are simularly specified in Line 1: Column 10-71. A "1" (for Line 1) is then entered in Column 73 and columns 74 and 75 of the card containing the literal "CC."

e. The fourth column of the series of pages contains the format used to read the variable described in the first three columns.

f. Using the transcription process described in the following pages, the entire set of Input Cards can be constructed. These pages are both necessary and complete in specifying the entire transcription process.

g. Once the entire set of Input Cards has been defined, they are keypunched. These cards are then assembled into decks and entered into the computer. These paragraphs describe how this assembly process is accomplished.

h. At the outset it should be understood that five separate card decks are required to form the total input to the model. The first card deck contains the tactical data for both the Red and Blue forces. The second deck contains the communications data for the Blue force. The third deck contains the communications data for the Red force. The fourth deck contains the STM data for the Blue force, and finally the fifth deck contains STM data for the Red force. The second and third decks are similar in structure and are processed by one program in two separate runs. Likewise, the fourth and fifth decks are similar in structure and are processed by the same program in two separate runs. Consequently, when the following paragraphs describe procedures for assembling the "Communications Deck," these procedures must be followed once for the Blue Communications Deck and once for the Red Communications Deck. Similarly, procedures for assembling the "STM Deck" refer both to the Blue STM Deck and the Red STM Deck.

2. Tactical Input Data

a. The Tactical Input Deck consists of 37 subdecks, one for each Data Block in the tactical set. In general, the identification of the subdeck is contained in columns 74 and 75, and columns 76 through 80 are available for

sequence numbering. The sequence numbers may be in a continuous sequence for all subdecks, or there may be one sequence for each subdeck. The computer identifies an input card by the subdeck identifer and the sequence number, hence either produces a unique identifier for each card.

b. In general each subdeck is terminated by a card which is blank in columns 74-75. Thus, after the keypunching process is complete, blank cards are added to the back of each subdeck, and the subdecks are assembled in a specified order. The order of subdecks follows:

CC
AAA
RB
RA
AA
AB
EB
FM
BA
BB
BC
BD
BE
CA
DA
EA
WE
FC
AT
ED
EE
FA
FB
FC
HA
JA
KA
LA
EG
LB
NA
OA
PA
PB

PC
PD
QA

c. Several items should be noted concerning this ordered list. First, the subdeck identified "AAA" contains its identification in columns 73 through 75, rather than the standard columns 74 and 75. Second, the first character of the identifier "QA" is the letter "O" and not the numeric digit. As mentioned above, each of the subdecks is terminated by a blank card. Although these cards need to be blank only in columns 74 and 75, it is better that the card be entirely blank with the possible exception of a sequence number in columns 76 through 80.

d. Some of the subdecks require additional special treatment. First, the subdeck "CC" contains a variety of constants in a variety of formats. To permit the computer to identify which format is to apply, the subdeck must be sequence numbered in columns 72 and 73. This sequence number must correspond exactly with the layout of each card. Missing cards are not permitted. Thus, the subdeck "CC" contains exactly 53 cards sequence numbered 1 through 53, and terminated with the appropriate blank card.

e. The subdeck "RA" also requires special treatment. It contains the basic terrain data for the grid squares over which the simulation takes place. This rectangle currently is dimensioned at 40 squares in the y-direction and 80 squares in the x-direction. Each card in the "RA" subdeck contains room for exactly 20 squares in the x-direction. These cards are organized into packets of 40 cards containing terrain data for a rectangle of 40 squares in the y-direction and 20 squares in the x-direction. Therefore, four packets are required to complete the terrain data. Each packet is preceded by a card containing the x-value of the first square described on each of the 40 cards of the packet. This index is placed in columns 1 through 3, right justified. The four packets are assembled in sequence of increasing x-values and are terminated by a blank card.

3. <u>Communications Input Deck</u>

a. As mentioned in the introduction, there is one Communications Input Deck for the Blue force and one for the Red force. The instructions contained in these paragraphs pertain equally to the assembly of both decks.

Each of the communications input sub decks contain the sub deck identifier in column 73-75. One should note that the identifiers are three characters in length, all alphabetic. Each sub deck is terminated with a card which is blank except for the characters "LIM" in columns 73-75, these cards perform a function similar to the blank cards which terminate the Tactical Input Subdecks.

The Communications Input Deck consists of fourteen subdecks arranged is a specific sequence. This sequence is given as follows:

CON
ARC
CHN
RUT
UNT
DAM
VUL
TPS
SET
WIR
DLY
CST
USE
PRE

All subdecks must be present in the above order with one exception.

If the "RUT" subdeck is missing, as it may well be when a simplified Red communications system is simulated, then the entire subdeck with the terminating "LIM" card is replaced with a card which contains "NON" in columns 73-75.

The "CON" subdeck describes to the preprocessor a number of constants. At the present time seven constants are described in this fashion. Consequently, the cards of the "CON" subdeck should be ordered as follows:

KOMOUSR
RANGEMAX
RANGEMIN
TRAVELIM
TSPECIAL
IMESLIM
KPASS

All of the other subdecks should be sequenced in order of increasing principal indices. In other words, the "UNT" subdeck should be sequenced in order of increasing unit numbers, the "CHN" subdecks sequenced in order of increasing channel numbers, and so on.

4. <u>The STM Input Deck</u>

a. As in the case of the Communications Deck, one STM Input Deck is prepared for the Blue force and one for the Red force. These instructions apply equally to both STM Decks.

b. The STM Input Deck is the simplest of all to prepare. It consists of three subdecks in the following order:

STA
STB
STC

These codes represent the subdeck identifiers which are punched into columns 73 through 75 of each card of their respective subdecks. Further, each STM input deck is terminated with a card which is blank in columns 73 through 75. Although it is not necessary, it is advisable that this card be blank in all other columns as well. It should be noted that only the STC subdeck is terminated with a blank card. The STM input subdecks should be assembled in order of increasing principal indices. For example, the "STA" subdeck should be sequenced in order of increasing STM Net Number, the "STB" subdeck sequenced in order of increasing STM Net Number and within that STM unit number, and so on.

TACTICAL INPUT DATA

DATA BLOCK CC

Line 1:

Cols:	1-8	TIN009-A	[FRMVCT(1,1)]	(F8.0)
	10-17	TIN009-A	[FRMVCT(2,1)]	(F8.0)
	19-26	TIN009-A	[FRMVCT(3,1)]	(F8.0)
	28-35	TIN009-A	[FRMVCT(1,2)]	(F8.0)
	37-44	TIN009-A	[FRMVCT(1,2)]	(F8.0)
	46-53	TIN009-A	[FRMVCT(2,2)]	(F8.0)
	55-62	TIN009-A	[FRMVCT(3,2)]	(F8.0)
	64-71	TIN009-A	[FRMVCT(4,2)]	(F8.0)
Cols:	72-73		[Line Number]	(I2)
	74-75		"CC"	(A2)

Line 2:

Cols:	1-8, 10-17	TIN009-B		
			ADTLIM(1), ADTLIM(2)]	(2F8.0)
	72-73		[Line Number]	(I2)
	74-75		"CC"	(A2)

Lines 3, 4, and 5 --Same as line 2 for MXRANG, MODEFF, and POSEFF from Form TIN009-F.

Remainder of Tactical Input Constants:

Cols:	12-19	Value from TIN009-B thru TIN009-G	(F8.0)
Cols:	72-73	Line Number	(I2)
Cols.	74-75	"CC"	(A2)

DATA BLOCK AAA

Cols.	7-10	TIN003- A	[XMPORG]	(F10.0)
Cols.	17-20	TIN003- A	[YMPORG]	(F10.0)
Cols.	73-75		"AAA"	(A3)

DATA BLOCK RB

Cols. 1-2	TIN033	[HGHOB1]	(F2.1)
Cols. 5-6	TIN033	[HGHOB2]	(F2.1)
Cols. 9-10	TIN033	[FCI]	(F2.1)
Cols. 13-14	TIN033	[FC2]	(F2.1)
Cols. 17-18	TIN033	[FC3]	(F2.1)
Cols. 74-75		"RB"	(A2)

DATA BLOCK RA

Cols.	1-3	TIN032-A	[I]	
cols.	4-6	TIN032-A	[J]	
Cols.	7-8	TIN032-B	(I,J)	(F2.1)
Col.	9	TIN032-A	(I,J)	(I1)

Repeat for increasing [I] (for same J) 19 times (total of 20 per card)

Cols.	74-75		"RA"	(A2)

DATA BLOCK AA

Cols. 1 - 3	TIN001	[I]	(I1)
Col. 5	TIN001	[UNTPGF]	(I1)
Col. 7	TIN001	[UNTYPE (I,2)]	(I3)
Cols. 9-10	TIN001	[UNTPTG]	(I2)
Cols. 12-13	TIN001	[UNTYPE (I,1)]	(I2)
Cols. 15-17	TIN001	[UNRDUS]	(F3.2)
Cols. 45-60	TIN002	[UNITNAME]	(4A4)
Cols. 74-75		"AA"	(A2)

DATA BLOCK AB

Cols.	1-3	TIN003-B	[I]	(I3)
Cols.	4-63	TIN003-B	Weapon Type or Visible Object Class 1-15	(15F4.0)
Cols.	74-75		"AB"	(A2)

DATA BLOCK EB

Cols. 1-2	TIN012-A	[I]	(I2)
	TIN012-B		
Cols. 4-39	TIN012-A	[ADJUST (I) - Right Half]	(12F3.0)
	TIN012-B		
Cols. 74-75		"EB"	(A2)

Enter all data from TIN012-A followed by data from TIN012-B.

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COMMEL II USER'S MANUAL. VOLUME II. INPUT DATA PREPARATION.(U)
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4 OF 4

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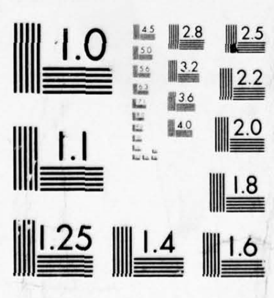

DATA BLOCK EM

Cols. 1-2	TIN017-A	[I]	(I2)
	TIN017-B		
Cols. 3-47	TIN017-A		
	TIN017-B	[ADJUST(I) left half]	(F3.2)
Cols. 74-75		"EM"	(A2)

DATA BLOCK BA

Cols.	1-2	TIN005-A	[I]	(I2)
Cols.	4-6	TIN005-A	[GPFDC1-left half]	(I3)
Cols.	8-10	TIN005-B	[GPFDC2]	(I3)
Cols.	12-14	TIN005-A	[GPFDC1-right half]	(I3)
Col.	15	TIN005-B	[GSATYP]	(I1)
Cols.	16-18	TIN005-C	[GRPRAD]	(F3.1)
Cols.	27-34	TIN005-D	[INTOBJ]	(F4.1)
Col.	44	TIN005-C	[GPMODE (I,1)]	(I1)
Cols.	45-47	TIN005-E	[CONAME]	(I3)
Col.	49	TIN005-F	[COSTYP]	(I1)
Cols.	50-53	TIN005-G	[CODPOS]	(F4.2)
Cols.	60	TIN005-H	[COSTAT]	(I1)
Cols.	62-69	TIN005-C	[GRPCRD(I,1)]-[GRPCRD(I,2)]	(F4.1)
Cols.	70-71	TIN005-B	[GPFDC3]	(I2)
Cols.	74-75		"BA"	(A2)

DATA BLOCK BB

Cols.	1-2	TIN006-A	[I]	(I2)
Cols.	4-7	TIN006-A	[FDCQ]	(F4.1)
Cols.	8-9	TIN006-B	[FDCTYM (I,2)]	(F2.0)
Cols.	10-11	TIN006-B	[FDCTYM (I,3)]	(F2.0)
Cols.	12-15	TIN006-C	[FDCRAT]	(F4.4)
Col.	16	TIN006-B	[FDCTYM (I,1)]	(I1)
Cols.	18-19	TIN006-B	[FDCTYM (I,4)]	(F2.0)
Cols.	21-23	TIN006-C	[FDCAMO]	(F3.0)
Cols.	25-27, 37-39, 49-51, 60-62	TIN006-D	Range for Batteries 1-4.	(F3.1)
Cols.	28-31, 40-43, 52-55, 63-66	TIN006-E	Values for Batteries 1-4.	(F4.2)
Cols.	32-35, 44-47, 56-59, 67-70	TIN006-F	[FDCFRC] for batteries 1-4.	(F4.3)
Cols.	74-75		"BB"	(A2)

DATA BLOCK BC

Cols.	5-10	TIN007 [GOPDST(1,1)] - X	(F6.1)
Cols.	11-16	TIN007 [GOPDST(1,2)] - Y	(F6.1)
Cols.	74-75	"BC"	(A2)

DATA BLOCK BD

Cols.	1-2		"01"	(I2)
Cols.	4-5	TIN007	[GCPNDX(1,1)]	(I2)
Cols.	7-8	TIN007	[GCPNDX(1,2)]	(I2)
Cols.	10-11	TIN007	[GCPNDX(1,3)]	(I2)
Cols.	13-16	TIN007	[GCPDST(1,3)] - X	(F4.1)
Cols.	17-20	TIN007	[GCPDST(1,4)] - Y	(F4.1)
Cols.	22-24	TIN007	[GCPDST(1,5)]	(F3.1)
Cols.	74-75		"BD"	(A2)

DATA BLOCK BE

Col. 1-2	TIN005-C	[I]	(I2)
Cols. 4-6	TIN005-C	[GRPWID]	(F3.1)
Cols. 74-75		"FE"	(A2)

DATA BLOCK CA

Cols.	1-2	TIN008-A	[I]	(I2)
Cols.	4	TIN008-A	[PTRNTP (I,1)]	(I1)
Cols.	6-9	TIN008-B	[PTRNRT]	(F4.2)
Cols.	11-12	TIN008-A	[PTRNTP(I,2)]	(I2)
Cols.	14-17	TIN008-C	[PTRNMV(I,1)]	(F4.1)
Cols.	19-22	TIN008-C	[PTRNMV(I,2)]	(F4.1)
Cols.	24-27	TIN008-C	[PTRNMV(I,3)]	(F4.1)
Cols.	29-32	TIN008-C	[PTRNMV(I,4)]	(F4.1)
Cols.	34-37	TIN008-C	[PTRNMV(I,5)]	(F4.2)
Cols.	38-40	TIN008-B	[PTRNRD]	(F3.1)
Cols.	42-43	TIN008-D	[J]	(I2)
Cols.	45-47	TIN008-D	[PUNMV(I,J)]	(I3)
Col.	49	TIN008-E	[PUNFLG(I,J,1)]	(I1)
Cols.	51-54	TIN008-F	[PUNCRD(I,J,1)]	(F4.1)
Cols.	56-59	TIN008-F	[PUNCRD(I,J,2)]	(F4.1)
Cols.	61-62	TIN008-H	[PUNPRP(I,J,1)]	(I2)
Cols.	64-65	TIN008-G	[PUNPRP(I,J,2)]	(I2)
Cols.	74-75		"CA"	(A2)

DATA BLOCK DA

Cols.	1-2	TIN010-A,D	[I]	(I2)
Cols.	4-7	TIN010-A,D	[PHI]	(F4.3)
Cols.	9-11	TIN010-A,D	[DETECT]	(F3.0)
Cols.	13-20	TIN010-B,E	[DMAX]	(F8.4)
Cols.	21-28	TIN010-B,E	[DMIN]	(F8.4)
Cols.	29-36	TIN010-C,F	[DMAX]	(F8.4)
Cols.	37-44	TIN010-C,F	[DMIN]	(F8.4)
Cols.	74-75		"DA"	(A2)

Enter all data from sheets TIN010-A thru TIN010-C followed by data from TIN010-D thru TIN010-F.

DATA BLOCK EA

Cols. 1-2	TIN011-A	[I]	(I2)
	TIN011-B		
Cols. 4-51	TIN011-A	[FYRFAC(I) - left half]	(12F4.0)
	TIN011-B		
Cols. 74-75		"EA"	(A2)

Enter all data from TIN011-A followed by all data from TIN011-B.

DATA BLOCK WE

Cols. 1-2	TINO 34-A	[I]	(I2)
	TINO 34-B		
Cols. 3-49	TINO 34-A	[FYRFAC (I) - right half]	(F3.0,11F4.0)
	TINO 34-B		
Cols. 74-75		"WE"	(A2)

Enter all data from TINO 34-A followed by data from TINO34-B.

DATA BLOCK EC

Cols. 1-2	TIN013-A	[I]	(I2)
Cols. 4-9	TIN013-A	[ARTDST(I) - left half]	(F6.5)
Cols. 10-13	TIN013-A	[ARTDST(I) - right half]	(F4.2)
Cols. 15, 17, 19, 21, 23, 25	TIN013-B	[TRGTWT(I,1) - TRGTWT (I,6)]	(I1)
Cols. 74-75		"EC"	(A2)

DATA BLOCK AT

Cols.	1-2	TIN004-A,B	[I]	(I2)
Cols.	4-63	TIN004-A,B	Weapon Types 1-15	(F4.0)
Cols.	74-75		"AT"	(A2)

Enter all data from TIN004-A (Blue)
and then all data from TIN004-B (Red).

DATA BLOCK ED

Cols. 1-2	TINO14-A	[I]	(I2)
Col. 4	TINO14-A	[MUVMOD]	(I1)
Cols. 6-10	TINO14-A	[ARDFAC(I,1,3)]	(F5.2)
Cols. 11-15	TINO14-A	[ARDFAC(I,2,3)]	(F5.3)
Cols. 16-18	TINO14-B	[ARDFAC(I,1,2) - left half]	(F3.3)
Cols. 19-23	TINO14-B	[ARDFAC(I,1,2) - right half]	(F5.0)
Cols. 25-27	TINO14-B	[ARDFAC(I,2,2) - left half]	(F3.3)
Cols. 28-32	TINO14-B	[ARDFAC(I,2,2) - right half]	(F5.0)
Cols. 33-38	TINO14-C	[ARDFAC(I,1,1)]	(F6.0)
Cols. 39-41	TINO14-C	[SUPTYM(I,1)]	(I3)
Cols. 42-47	TINO14-C	[ARDFAC(I,2,1)]	(F6.0)
Cols. 48-50	TINO14-C	[SUPTYM(I,2)]	(I3)
Cols. 74-75		"ED"	(A2)

DATA BLOCK EE

Cols. 1-2	TIN015-A	[I]	(I2)
Cols. 7-32	TIN015-A	Row I	(F2.1)
Cols. 37-62	TIN015-B	Row I	(F2.1)
Col. 74-75		"EE"	(A2)

DATA BLOCK FA

Cols. 1-2	TIN018-A	[I]	(I2)
Cols. 4-9	TIN018-A	[ATTRIT - left half]	(F6.6)
Cols. 11-17	TIN018-A	[ATTRIT - right half]	(F7.7)
Cols. 19-22	TIN018-B	[SURDEG]	(F4.2)
Cols. 24-28	TIN018-B	[SESWTR - right half]	(F5.3)
Cols. 30-34	TIN018-B	[SESWTR - left half]	(F5.3)
Col. 74-75		"FA"	(A2)

DATA BLOCK FB

Cols.	1-2	TIN019-A,B	[I]	(I2)
Cols.	4-5	TIN019-A,B	Mode	(I2)
Cols.	7-10	TIN019-A,B	[WEPRNG(I1,) - WEPRNG (I,12)]	(F4.2)
	12-15			
	17-20			
	22-25			
	27-30			
	32-35			
	37-40			
	42-45			
	47-50			
	52-55			
	57-60			
	62-65			
Cols.	74-75		"FB"	(A2)

Enter all data from TIN019-A followed by all data from TIN019-B.

DATA BLOCK FC

Cols. 1-2	TINC20-A	[I]	(I2)
Cols. 4-7, 9-12, 14-17, 19-22, 24-27, 29-32, 34-37	TIN020-A	Row I	(F4.4)
Cols. 39-42, 44-47, 49-52, 54-51, 59-62, 64-67, 69-72	TINC20-B	Row I	(F4.4)
Cols. 74-75		"FC"	(A2)

DATA BLOCK HA

Cols. 1-2	TIN021	[I]	(I2)
Cols. 4-8	TIN021	[GRPEFF(I,1]	(F5.4)
Cols. 21-22	TIN021	[GRPEFF(I,4)]	(F2.1)
Cols. 24-25	TIN021	[GRPEFF(I,2)]	(F2.1)
Cols. 27-28	TIN021	[GRPEFF(I,3)]	(F2.1)
Cols. 30-31	TIN021	[GRPEFF(I,5) - left half]	(F2.1)
Cols. 33-34	TIN021	[GRPEFF(I,5) - right half]	(F2.1)
Cols. 74-75		"HA"	(A2)

DATA BLOCK JA

Cols. 1-3	TIN022-A	[INPAIR (I,1) - left half]	(I3)
Cols. 5-7	TIN022-A	[INPAIR(I,1) - right half]	(F.3.3)
Col. 9	TIN022-B	[INPAR 2(I,1,2)]	(I1)
Cols. 11-13	TIN022-B	[INPAR2(I,1,1)]	(I3)
Cols. 15-17	TIN022-B	[INPAR2(I,1,3)]	(I3)
Col. 19-21	TIN022-A	[INPAIR(I,2) - left half]	(I3)
Cols. 23-25	TIN022-A	[INPAIR(I,2) - right half]	(F3.3)
Col. 27	TIN022-B	[INPAR2(I,2,2)]	(I1)
Cols. 29-31	TIN022-B	[INPAR2(I,2,1)]	(I3)
Cols. 33-35	TIn022-B	[INPAR2(I,2,3)]	(I3)
Cols. 74-75		"JA"	(A2)

DATA BLOCK KA

Cols. 1-72	TIN023	(Coord [I,1] - Left and right half Repeat line until up to 40 unit pairs are input.	(I3,1X)
Cols. 74-75		"LA"	(A2)

DATA BLOCK LA

Cols. 1-3	TIN024-A	Blue	(I3)
Cols. 6-8	TIN024-A	Red	(I3)
Cols. 74-75		"LA"	(A2)

DATA BLOCK EG

Cols. 1-2	TIN016,A,B,	Mode	(I2)
Cols. 4-5	TIN016-A,B	[J]	(I2)
Cols. 6-13	TIN016-A,B	Strength	(F8.0)
Cols. 14-69	TIN016-A,B	Surveillance device types	(F8.0)
Cols. 74-75		"EG"	(A2)

DATA BLOCK LB

Cols.	1-3 19-21 37-39 55-57	TIN025-A	[SURUNT]	(I3)
Cols.	5-7 23-25 41-43 59-61	TIN025-A	[SURMS1]	(I3)
Col.	9 27 45 63	TIN025-A	LOG	(I1)
Cols.	10-12 28-30 46-48 64-66	TIN025-A	ROW	(I3)
Cols.	13-14, 31-32, 49-50, 67-80	TIN025-A	[TYPE]	(I2)
Cols.	15-17, 33-35, 51-53, 69-71	TIN025-A	Dline index	(I3)
Cols.	74-75		"LB"	(A2)

DATA BLOCK NA

Cols. 1-3	TIN035	[I]	(I3)
Cols. 5-6	TIN035	[MESGES(I,5)]	(I2)
cols. 8-9	TIN035	[MESGES(I,6)]	(I2)
Cols. 11-14	TIN035	[MESGEL]	(F4.2)
Cols. 16-18	TIN035	[MESGES(I,4)]	(I3)
Cols. 19-23	TIN035	[MESGES(I,1)]	(F5.2)
Col. 25	TIN035	[FLAG1]	(I1)
Col. 27	TIN035	[FLAG2]	(I1)
Cols. 74-75		"NA"	(A2)

DATA BLOCK OA

Cols. 1-3	TIN026	[I]	(I3)
Cols. 6-8	TIN026	[MVMSG1 - right half]	(I3)
Cols. 11-13	TIN026	[MVMSG2]	(I3)
Cols. 74-75		"OA"	(A2)

DATA BLOCK PA

Col.	1	TIN027-A	[I]	(I1)
Col.	2-3	TIN027-A	[J]	(I2)
Cols.	6-7	TIN027-A	[BATMFR(I,J,1)]	(F2.0)
Cols.	8-9	TIN027-B	[BTSINP(I,J,1)]	(F2.0)
Cols.	10-11	TIN027-B	[BTSINP(I,J,3)]	(F2.1)
Cols.	12-13	TIN027-A	[BATMFR(I,J,2)-left half]	(F2.0)
Cols.	14-17	TIN027-C	[BTSINP(I,J,4)] - X	(F4.1)
Cols.	18-21	TIN027-C	[BTSINP(I,J,5)] - Y	(F4.1)
Cols.	22-23	TIN027-A	[BATMFR(I,J,2)-right half]	(F2.1)
Cols.	24-25	TIN027-D	[BTGPNO]	(I2)
Cols.	26-27	TIN027-D	[BTPTNO]	(I2)
Cols.	28-31	TIN027-E	[BATTHR]	(F4.0)
Cols.	32-33	TIN027-F	[BATDCI]	(F2.0)
Col.	34	TIN027-G	[BTNOCO(I,J,1)]	(I1)
Cols.	35-37	TIN027-H	[BTSINP(I,J,8)]	(F3.1)
Cols.	38-39	TIN027-H	[BTSINP(I,J,10)-left half]	(F2.0)
Cols.	40-41	TIN027-H	[BTSINP(I,J,10)-right half]	(F2.0)
Col.	42	TIN027-G	[BTMXCO]	(I1)
Col.	43	TIN027-G	[BATTCO]	(I1)
Cols.	44-45	TIN027-B	[BTSINP(I,J,2)]	(F2.1)
Cols.	46-47	TIN027-F	[BTSINP(I,J,9)]	(F2.0)
Cols.	48-50	TIN027-I	[BTSINP(I,J,6)]	(F3.))
Cols.	51-53	TIN027-I	[BTSINP(I,J,11)-left half]	(I3)

Cols.	54-57	TIN027-J	[BATOBJ(I,J,1)] - x	(F4.1)
Cols.	58-59	TIN027-D	[BTNOCO(I,J,2)]	(I2)
Cols.	60-61	TIN027-D	[IOTYP]	(I2)
Cols.	62-65	TIN027-J	[BATOBJ(I,J,2)] - y	(F4.1)
Cols.	66-68	TIN027-I	[BTSINP(I,J,11)-right half]	(I3)
Cols.	69-72	TIN027-E	[BTSINP(I,J,7)]	(F4.3)
Cols.	74-75		"PA"	(A2)

DATA BLOCK PB

Cols.	1-2	TIN028	[I]	(I2)
Cols.	4-5	TIN028	[DIVBRG(I,1)]	(I2)
Cols.	7-9	TIN028	[DIVACT(I,2)-left half]	(F3.0)
Cols.	11-12	TIN028	[DIVCMT]	(I2)
Cols.	14-16	TIN028	[DIVHQN]	(I3)
Cols.	18-20	TIN028	[DIVACT(I,1]	(F3.0)
Cols.	27-28	TIN028	[DIVBRG(I,2)]	(I2)
Cols.	30-32	TIN028	[DIVACT(I,2)-right half]	(F3.0)
Cols.	74-75	TIN028	"PB"	(A2)

DATA BLOCK PC

Cols.	1-2	TIN029-A	DIVISION (B=1, R=2)	(I2)
Cols.	4-5	TIN029-A	[I]	(I2)
Cols.	11-12	TIN029-A	[BRGCTS(I,1)]	(F2.0)
Cols.	14-15	TIN029-A	[BRGCTS(I,4)-left half]	(F2.0)
Cols.	28-29	TIN029-B	[BRIGWT]	(F2.1)
Cols.	31-32	TIN029-B	[BRGINT]	(F2.0)
Cols.	34-35	TIN029-A	[BRGBAT]	(I2)
Cols.	37-38	TIN029-A	[BRGCTS(I,4)-right half]	(F2.0)
Cols.	40-41	TIN029-A	[BRGCBT(I,1)]	(I2)
Cols.	43-45	TIN029-B	[BRIGHQ-right half]	(I3)
Cols.	47-50	TIN029-A	[BRGCTS(I,2)]	(F4.0)
Cols.	52-54	TIN029-B	[BRIGMEB(I,1)]	(I3)
Cols.	56-57	TIN029-B	[BRIGMEB(I,2)]	(I2)
Cols.	59-62	TIN029-A	[BRGCRD(I,1)]	(F4.1)
Cols.	63-66	TIN029-A	[BRGCRD(I,2)]	(F4.1)
Cols.	68-69	TIN029-A	[BRGCTS(I,3)]	(F2.1)
Col.	71	TIN029-B	[BRGRES]	(I1)
Cols.	74-75		"PC"	(A2)

DATA BLOCK PC

Cols.	1-2	TIN030	[I]	(I2)
Cols.	4-6		J= Number of units committed minus 1. The program assumes that J will be 1 and 2 for each I.	
Cols.	8-10	TIN030	[CORDAD(I,J,1) - left]	(I3)
Cols.	12-14	TIN030	[CORDAD(I,J,1) - right]	(I3)
Cols.	16-18	TIN030	[CORDAD(I,J,2) - left]	(I3)
COLS.	20-22	TIN030	[CORDAD(I,J,2) - right]	(I3)
Cols.	24-26	TIN030	[CORDAD(I,J,3)-left]	(I3)
Cols.	28-30	TIN030	[CORDAD(I,J,3)-right]	(I3)
Cols.	74-75		"PD"	(A2)

DATA BLOCK QA

Cols.	1-3	TIN031	[I]	(I3)
Cols.	6-7	TIN031	[DACUTSLO]	(F2.0)
Cols.	10-11	TIN031	[DACUTSHI]	(F2.0)
Cols.	13-14	TIN031	[PRIORITY]	(I2)
Cols.	74-75		"QA"	(A2)

COMMUNICATIONS INPUT DATA
(CARD)

DATA BLOCK CONSTANTS

<u>Card 1</u>

Col. 12	CIN003	KOMONU	(I1)
Cols. 73-75		"CON"	(A3)

<u>Card 2</u>

Cols. 12-19	CIN003	RANGMX	(F8.5)
Cols. 73-75		"CON"	(A3)

<u>Card 3</u>

Cols. 12-19	CIN003	RANGMN	(F8.5)
Cols. 73-75		"CON"	(A3)

<u>Card 4</u>

Cols. 12-19	CIN003	TRVCTM	(F8.5)
Cols. 73-75		"CON"	(A3)

<u>Card 5</u>

Cols. 12-19	CIN003	TSPECL	(F8.5)
Cols. 73-75		"CON"	(A3)

<u>Card 6</u>

Cols. 12-14	CIN003	IMESLM	(I3)
Cols. 73-75		"CON"	(A3)

<u>Card 7</u>

Col. 12	CIN003	KPASS	(I1)
Cols. 73-75		"CON"	(A3)

<u>Card 8</u>

Cols. 73-75		"LIM"	(A3)

DATA BLOCK ARCLOG

Cols. 2-4	CIN001-A	Net Number	(I3)
Cols. 6-8	CIN001-A	[ARCLOG(I,6)-right half]	(I3)
Cols. 10-12	CIN001-A	[ARCLOG(I,6)-left half]	(I3)
Cols. 14-16	CIN001-A	[ARCLOG(I,1)]	(I3)
Cols. 18-20	CIN001-A	[ARCLOG(I,2)]	(I3)
Cols. 22-23	CIN001-A	[ARCTYP]	(I2)
Cols. 25-28	CIN001-B	[ARCLOG(I,4)]	(F4.2)
Col. 30	CIN001-B		(A1)
Cols. 32-33	CIN001-B		(I2)
Col. 34	CIN001-B	[ARCFLG(I,3)]	(A1)
Cols. 36-37	CIN001-C	[ARCLOG(I,8)-right half]	(I2)
Cols. 39-40	CIN001-C	[ARCLOG(I,8)-left half]	(I2)
Cols. 42-43	CIN001-C	[DAMT1]	(I2)
Cols. 45-46	CIN001-C	[DAMT2]	(I2)
Cols. 48-49	CIN001-D	[CPDGPN]	(I2)
Cols. 51-52	CIN001-D	[ARCLOG(I,3)]	(I2)
Coo. 54	CIN001-D	[ARCFLG(I,2)]	(A1)
Col. 56	CIN001-D	[ARCFLG(I,4)]	(A1)
Cols. 58-60	CIN001-E	Column S	(I3)
Cols. 62-64	CIN001-E	Column T	(I3)
Cols. 66-67	CIN001-E	Column U	(I2)
Col. 69	CIN001-E	Column U	(I1)
Col. 71	CIN001-E	Column V	(I1)
Cols. 73-75		"ARC"	(A3)

DATA BLOCK CHANELOG

Cols.	2-4	CIN002	[NET]	(I3)
Col.	6	CIN002	[CHNLOG(I,2)]	(I1)
Col.	7-9	CIN002	[CHNLOG(I,3)]	(I3)
Cols.	11-12	CIN002	[CHNLOG(I,5)]	(I2)
Col.	14	CIN002	[CHNLOG(I,1)]	(A1)
Cols.	16-17	CIN002	[CHNLOG(I,4)]	(I2)
Cols.	73-75		"CHN"	(A3)

DATA BLOCK ROUTELOG

Cols. 2-4	CIN007	[I]	(I3)
Cols. 6-8	CIN007	Column A	(I3)
Cols. 10-12	CIN007	Column B	(I3)
Cols. 14-16	CIN007	[TYMLOG(I,2)]	(I3)
Cols. 18-20	CIN007	[TYMLOG(I,1)]	(I3)
Cols. 73-75		"RUT"	(A3)

DATA BLOCK UTECHFAC

Cols. 7-9	CINO12	[I]	(I3)
Cols. 28-30	CINO12	[UTEKFK]	(F3.1)
Cols. 73-75		"UNT"	(A3)

DATA BLOCK DAMAGLOG

Cols.	3-4	CIN004-A	[I]	(I2)
Col.	8	CIN004-A	[DMGLOG(I,9)]	(I1)
Cols.	10-11, 13-14, 16-17, 19-20, 22-23, 25-26, 28-29, 31-32	CIN004-B	[DMGLOG(I,1)-DMGLOG(I,8)]	(I2)
Cols.	35-39	CIN004-A	[RPARLG(I,1)]	(I5)
Cols.	42-48	CIN004-A	[RPARLG(I,2)]	(F7.6)
Cols.	73-75		"DAM"	(A3)

DATA BLOCK VULNRLOG

Cols. 9-10	CIN013	[I]	(I2)
Cols. 15-18	CIN013	[VULNLG]	(F4.0)
Cols. 73-75		"VUL"	(A3)

DATA BLOCK SETYPLOG

Cols. 3-4	CIN009	[I]	(I2)
Cols. 7-8	CIN009	[STYPLG(I,1)]	(I2)
Cols. 10-11	CIN009	[STYPLG(I,2)]	(I2)
Cols. 13-14	CIN009	[STYPLG(I,3)]	(I2)
Cols. 16-17	CIN009	[STYPLG(I,4)]	(I2)
Cols. 73-75		"TPS"	(A3)

DATA BLOCK SETLOG

Cols.	5-6	CIN008	[I]	(I2)
Cols.	10-11	CIN008	[SETLOG(I,1)]	(I2)
Cols.	14-15	CIN008	[SETLOG(I,2)]	(I2)
Cols.	21-23	CIN008	[RADRNG]	(I3)
Cols.	73-75		"SET"	(A3)

DATA BLOCK WIRELOG

Cols. 11-13	CIN014	[I]	(I3)
Cols. 16-21	CIN014	[WIRLOG(I,1)]	(F6.5)
Cols. 28-29	CIN014	[WIRLOG(I,2)]	(I2)
Cols. 36-37	CIN014	[WIRLOG(I,3)]	(I2)
Cols. 73-75		"WIR"	(A3)

DATA BLOCK DELAYLOG

Cols. 5-6	CINO 05	[I]	(I2)
Cols. 11-13	CINO 05	[DLYLOG(I,1)]	(I3)
Cols. 19-21	CINO 05	[DLYLOG(I,2)]	(I3)
Cols. 73-75		"DLY"	(A3)

DATA BLOCK TYPELOG

Cols. 10-11	CIN010	[TYPLOG(I,1)]	(I2)
Cols. 14-15	CIN010	[TYPLOG(I,2)]	(I2)
Cols. 26-27	CIN010	[CONCST]	(I2)
Cols. 30-32	CIN010	[CONDLY]	(I3)
Cols. 73-75		"CST"	(A3)

DATA BLOCK USAGFLOG

Cols. 5-6	CIN011	[I]	(I2)
Cols. 9-10	CIN011	[USGLOG(I,1)]	(I2)
Cols. 13-14	CIN011	[USGLOG(I,2)]	(I2)
Cols. 17-18	CIN011	[USGLOG(I,3)]	(I2)
Col. 21-22	CIN011	[USGLOG(I,4)]	(I2)
Cols. 73-75		"USE"	(A3)

DATA BLOCK PRELOG

Col. 16	CIN006	[I]	(I2)
Cols. 20-23	CIN006	[PRELOG]	(F4.0)
Cols. 73-75		"PRE"	(A3)

STM INPUT DATA
(CARD)

DATA BLOCK STA

Cols. 3-5	STM001-A	[NET]	(I3)
Cols. 10-11	STM001-A	Column B	(I2)
Cols. 16-17	STM001-A	Column C	(I2)
Col. 22	STM001-A	Column D	(I1)
Col. 27	STM001-A	Column E	(I1)
Col. 30	STM001-B	Column F	(I1)
Col. 33	STM001-B	Column G	(I1)
Col. 39	STM001-B	Column H	(I1)
Cols. 43-45	STM001-B	Column I	(I3)
Cols. 51-53	STM001-C	Column J	(F3.1)
Cols. 58-59	STM001-C	Column K	(I2)
Cols. 64-68	STM001-C	Column L	(F5.3)
Cols. 73-75		"STA"	(A3)

DATA BLOCK STB

Cols. 3-5	STM002	[NET TYPE]	(I3)
Cols. 10-12	STM002	Column B	(I3)
Col. 16	STM002	Column C	(I1)
Cols. 73-75		"STB"	(A3)

DATA BLOCK STC

Cols. 10-11	STM003-A	Column A	(I2)
Col. 16	STM003-A	Column B	(I1)
Cols. 21-22	STM003-A	Column C	(I2)
Cols. 25-26	STM003-A	Column D	(I2)
Cols. 31-32, 35-36, 39-40, 43-44	STM003-B	Columns E-H	(I2)
Cols. 50-51, 54-55, 58-59, 62-63	STM003-C	Columns I-L	(I2)
Cols. 73-75		"STC"	(A3)